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ANNUAL REPORT

JULY 1, 1987 - JUNE 30, 1988

BOYD G. STEPHENS, M.D.  
CHIEF MEDICAL EXAMINER

850 BRYANT STREET  
SAN FRANCISCO, CALIF. 94103

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CHIEF MEDICAL EXAMINER - CORONER  
SAN FRANCISCO, CALIFORNIA

ANNUAL REPORT

JULY 1, 1987 - JUNE 30, 1988



BOYD G. STEPHENS, M.D.  
CHIEF MEDICAL EXAMINER

JOSEPH E. SURDYKA  
ADMINISTRATIVE CORONER

850 BRYANT STREET  
SAN FRANCISCO, CALIF. 94103





January 1989

Honorable Art Agnos, Mayor  
Honorable Board of Supervisors  
City and County of San Francisco  
City Hall  
San Francisco, California 94102

Dear Mayor Agnos and Honorable Supervisors:

1988 was a difficult year for the Medical Examiner's Office. During this time we were faced with budget constraints as well as with reduced staffing without any decrease in workload. The relative workload constituting the amount of time spent in court or preparing for court has actually continued to increase.

Of significant interest is the work being done on child abuse, sexual assaults, drug abuse and the reflection of its effect on other departments or the court system.

The major community issues that directly affected this department were the homeless and those deaths due to cocaine, especially crack cocaine, in which there is an almost arithmetic increase in the numbers of deaths occurring from that drug. Thanks to the hard, exceptional work of the employees in this department almost all of the objectives set were realized and those that were not were largely due to factors beyond any control of the employees. Our major objectives for the next year are to bring our professional staffing up to a level that allows for the quality of work that is needed in the County.

Sincerely,

A handwritten signature in black ink, appearing to read "Boyd G. Stephens".  
Boyd G. Stephens, M.D.  
Chief Medical Examiner



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## INTRODUCTION

The Medical Examiner-Coroner is appointed by law to many responsibilities, the foremost of which is the investigation and certification of a variety of deaths including all deaths of other than natural causation, and any apparently natural deaths in which no physician can reasonably state the cause. The Medical Examiner can utilize any and all medico-legal investigative techniques, including autopsy, to establish both the medical cause of death, and mode or circumstances of death (natural, accident, homicide, suicide or undetermined).

The deaths which must be reported to the Medical Examiner-Coroner, as required by various sections of the Government, Health and Safety and Penal codes, are as follows:

1. Homicide - known or suspected
2. Suicide - known or suspected
3. Following accident or injury (whether the accident or injury is the primary cause or contributory with death occurring immediately or at some remote time)
4. Medical attendance of less than 20 days
5. No physician in attendance
6. Physician unable to state the cause of death (must be unable, not merely unwilling)
7. Poisoning (food, chemical, drug, therapeutic agents)
8. Occupational or industrial deaths
9. All deaths where a patient has not fully recovered from an anesthetic, whether in surgery, recovery room, or elsewhere
10. All deaths in operating rooms
11. All solitary deaths (unattended by physicians or other person in the period immediately preceding death)
12. All deaths in which the patient is comatose throughout the period of the physician's attendance
13. All deaths of unidentified persons
14. Grounds to suspect that the death occurred in any degree from a criminal act
15. Contagious disease - known or suspected - and constituting a public health hazard
16. Deaths in prison or while under sentence
17. Associated with a rape - known or alleged - or crime against nature
18. Related to or following abortion - known or suspected
19. Involving drowning, fire, hanging, gunshot, stabbing, cutting, starvation, exposure, alcoholism, drug addiction, strangulation or aspiration

Additional mandated responsibilities include protection and safekeeping of property belonging to deceased individuals, conducting inquests when indicated, maintaining proper public records, making reports to other agencies, identification of deceased persons, interment of indigent dead, and many other death-related activities.

The work with the living is discussed elsewhere.

## FORENSIC MEDICINE

Forensic medicine is generally considered to be a marriage of medicine and the forensic sciences oriented to medico-legal issues. The field is wide ranging and growing, becoming even broader in scope than the traditional concept practiced in Europe.

Forensic medicine plays a major role in the evaluation and understanding of unusual deaths, whether they involve mass killings, drug problems, or community issues. The expertise that this field brings to the understanding of the medicolegal issues, both by data collection and by interpretation, is an important factor in how the community responds, as well as how the judiciary reviews a case.

Generally, we receive little publicity for this work. Yet, in addition to our traditional work, we serve in a number of places in the community. Some of these include:

### Examination and diagnosis of the living;

- Examination and evaluation of child abuse
- Examination and evaluation of sexual assault
- Examination and evaluation of spousal abuse
- Evaluation of citizens' complaints against the police department
- Testimony and interpretation of hospital records and procedures
- Evaluation of force and patterned injuries
- Examination of victims and suspects for trace evidence and injuries
- Collection of blood from suspects and victims for serology, toxicology and other testing
- Alcohol and drug interaction in driving under the influence cases and related issues
- Physiologic effects of drug interactions
- Toxicology, including environmental and industrial toxicity
- Teaching - hospital, forensic, law enforcement, community

### Examination and evaluation of the dead;

- Scene investigation, reconstruction and analysis
- Evidence collection and testing
- Blood spatter analysis and interpretation
- Patterned evidence analysis and interpretation
- Trace evidence collection
- Time and place of death information
- Forensic Autopsy consultation and interpretation
- Analysis for chemical and limited serology testing
- Forensic toxicology
- Consultation with District Attorney and Public Defender
- Analysis and court presentation
- Teaching - forensic and legal medicine

The department faces some significant problems now and for the future. One of these is the increasing numbers of "designer drugs" made for a number of reasons, including the avoidance of existing federal laws. These chemical analogues or new molecules constantly require new analytic approaches, techniques and standards. Hazards to users, officers and laboratory personnel are largely unknown, and some of the compounds are so dangerous that skin contact can be lethal or can produce delayed complications such as Parkinson's degeneration of the brain.

The need for ever-increasing scientific capabilities in instrumentation and techniques results in a requirement for increasing training and equipment for the department. Interfacing with other agencies and departments is increasing along with the need for information sources and sharing. These are some of the major problems for the future. The information and records issue will necessitate a major decision and policy-making step over the next five years. Although the initial costs to the County will be relatively high, the long-term benefits and costs savings will more than off-set this investment of time and money. Obtaining access to major library data bases, legal information, and records management will constitute some of the most expensive and time-consuming aspects of department management for this next five year period. The forensic world is growing so rapidly that is is difficult to foresee its exact direction. Trace evidence and serology are unquestionably going to be a large part of that future for the next five years and this department will be right in the middle of these advances.

#### STATEMENT OF CURRENT MANAGEMENT AND SCIENTIFIC POSITION

The physical facilities of the San Francisco Medical Examiner's office are well designed and are suitable for the forensic medicine work routinely performed in this county. Some facility improvements are planned for this year to improve the safety features of the building - features that were unknown or not required at the time of the initial construction in the 1960's. Additionally, because of the increasing work load, the toxicology department is being expanded to allow for the new instrumentation needed for analysis of the types of drugs being used in our community today. Many of these new and dangerous drugs can only be detected by sophisticated equipment since the levels of these drugs in the body are so very low. There are still some personnel issues, being addressed with the help of Civil Service, which should be largely resolved in the near future. Many of the problems of administration for the department pertain to record and data handling procedures which are quite out of date. Changes are underway to computerize many of the routine investigative reports as well as most of the operating records of the department. If the department can be completely computerized, much unnecessary paperwork can be eliminated, thereby streamlining the functions of the office and bringing productivity more in line with other County offices. These proposed changes would allow us to more properly address our primary function - the practice of forensic medicine - and to spend less time on the mechanics of paper generation.

## I. ADMINISTRATIVE

Staffing in this section has recently been brought to the required level. There is a need to restructure the office so that job descriptions, workloads and salaries properly correlate with the actual work requirements and needs of the facility. Training has been completed for basic computer utilization, and the office is being changed to computerization of records without major difficulties. All investigative records need to be converted to computer format, which will aid in record-keeping and distribution and will reduce bookbinding costs. This will allow direct exchange of records with other agencies that need our information and will improve the productivity of the office.

## II. INVESTIGATIVE

One new deputy position has been authorized and staffed. Follow-up investigations will be a primary job assignment for this person, reducing the work load on the forensic pathologists, allowing them to do other work, and improving the accuracy of the work we produce. Currently, there often simply is not enough time to do the degree of investigation required to ensure that all appropriate information is available prior to court testimony or completion of a case.

Our total case load, as far as numbers are concerned, appears to be staying about the same, with the deputies investigating approximately 4,000 cases annually. Legislation is likely to make the deputies work significantly more difficult by requiring both evaluation for tissue donation and investigation for religious statement of non-autopsy preference as part of their investigation procedure. The religious bill will require that this office take on some degree of legal advocacy position, since it will require a public court hearing in Superior Court any time that we believe an autopsy is required to determine the cause and manner of death but where the patient has signed a statement of religious preference opposing the autopsy. This will require close and frequent cooperation between the City Attorney and the Superior Courts. Because it takes a routine medical decision and makes it an open court advocacy procedure, we expect that there will be considerable negative press representation and a high probability of legal action against the County. Under this law, if a person who drives his car at high speed onto a sidewalk, injuring several people and causing his own death, has a signed religious preference document, the coroner or medical examiner would be prohibited from taking samples or performing an autopsy except by court order. Anytime that death was sudden and unexpected, but not obviously a homicide or due to a contagious disease, and an autopsy was needed to determine the cause and manner of death, a court hearing would be required if the religious document was indicated by a relative or friend. It is difficult to predict the actual extent of this law or the actual costs to the county at this time. One religious group has indicated that it will be starting an extensive campaign to encourage people of all religions to sign these documents.

All of the deputies have completed the P.C. 832 basic course, and several have completed the basic blood spatter course. All have received additional formal training on evidence and forensic medicine. The next major educational goal for the deputies will be in report writing. Additionally, because the investigational needs of the department are changing, we have changed the

requirements for the deputies, deleting the requirement for a mortuary background and upgrading the educational and writing capabilities to move the job description more in line with the job requirements.

Improvements in equipment and facilities for the deputies has continued during the year, and will continue into the next year. There is an increasing requirement for the deputies to go to court. With the turnover in Deputy District Attorneys and Public Defenders and the changes in the appellate courts, strict requirements for evidence presentation become more and more common. This appears to be largely due to Proposition 8 requirements as well as to changes in the policy of the court of appeals. As such, a budget item for court funding for the deputies may become necessary in the next budget.

### III. TOXICOLOGY

More than any other department in this office, toxicology has shown the most growth and need to expand. Current in this year's budget is a major expansion and refurbishing of the laboratory to both expand its capabilities and, simultaneously, to improve the safety and protection of personnel and equipment in the laboratory. To protect the very expensive electronic equipment, a Halon fire extinguishing system, which is computer compatible, has been installed. A rear safety exit and other safety changes bring the section up to current fire and safety code compliance for both OSHA and fire codes.

Continuing problems are the never-ending stream of new street drugs and the increasing numbers of drugs, both legitimate and illegal, that have physiologic levels so low that very special equipment is necessary for their detection. One good example is fentanyl and its chemical analogs. This drug is being reported many times in counties around San Francisco but, so far, we have not detected it in cases here. However, it has been detected in "street buys" of evidence recovered from various cases in the County. Increasingly, low physiological levels are true of the pharmaceuticals prescribed by physicians as well as for some of the older illegal preparations seen on the street. Examples are LSD and some of the drug metabolites. A gas chromatograph/mass spectrograph has made a considerable difference in laboratory capabilities. This equipment is extremely beneficial to this department as well as aiding the crime laboratory and the SFGH toxicology laboratory. Additionally, our toxicology laboratory has been doing testing for the police recruit program as well as for other agencies.

### IV. AUTOPSY FACILITIES

There has been a significant increase in the number of autopsies of contagious or suspected infectious cases over the past year. This is partly due to the AIDS epidemic present in the community. We are finding more cases, such as TB, that require autopsies in isolation. The incidence of contagious diseases is increasing. We need to continue to improve our capabilities to work with contagious diseases. Employee safety is a major concern.

Improved capability of photographic documentation of evidence was achieved in the past budget.

## V. INQUEST DIVISION

We have not experienced the anticipated problems with SB 1824 (Religious Bill) since its enactment in January 1985. We continue to rely on the traditional inquest. This division is adequately staffed for the current level of work.

## VI. FORENSIC PATHOLOGY DIVISION

The teaching program suffered a setback, but we are on the road to returning it to the previous level of activity. It had received wide acclaim, and has been given budget support. The fellowship program is approved by the AMA for two positions.

## VII. CONSULTATION SERVICE

Requests for expert consultation in the field of forensic medicine continue to increase in numbers and scope. Currently, we do the laboratory testing and some of the court presentations in sexual assault cases that are examined at SFGH. We frequently examine children and adults for evidence of injury or non-injury in issues of assault in cases of child abuse, wife abuse and police assaults. We are part of an active child abuse prevention program through a committee designed to detect abuse or family stress in cases of death, and potentially to prevent similar incidents in siblings in the same family. We are also active in suicide prevention programs.

We are active in drunk driving programs, including detection, analysis, evaluation and court presentation of evidence. This is through the Mayor's Drunk Driving Program as well as through other programs. We routinely perform analysis of biological samples for the District Attorney, Public Defender or Highway Patrol, and testify in court on the medical or toxicologic aspects of the case.

Our Forensic Anthropologist, Dr. Rodger Heglar (retired), and our Forensic Odontogist, Dr. Oliver Harris, have spent hundreds of hours on the Calaveras County case, with many more hours needed to complete their painstaking work. This case is likely to go to court in the near future.

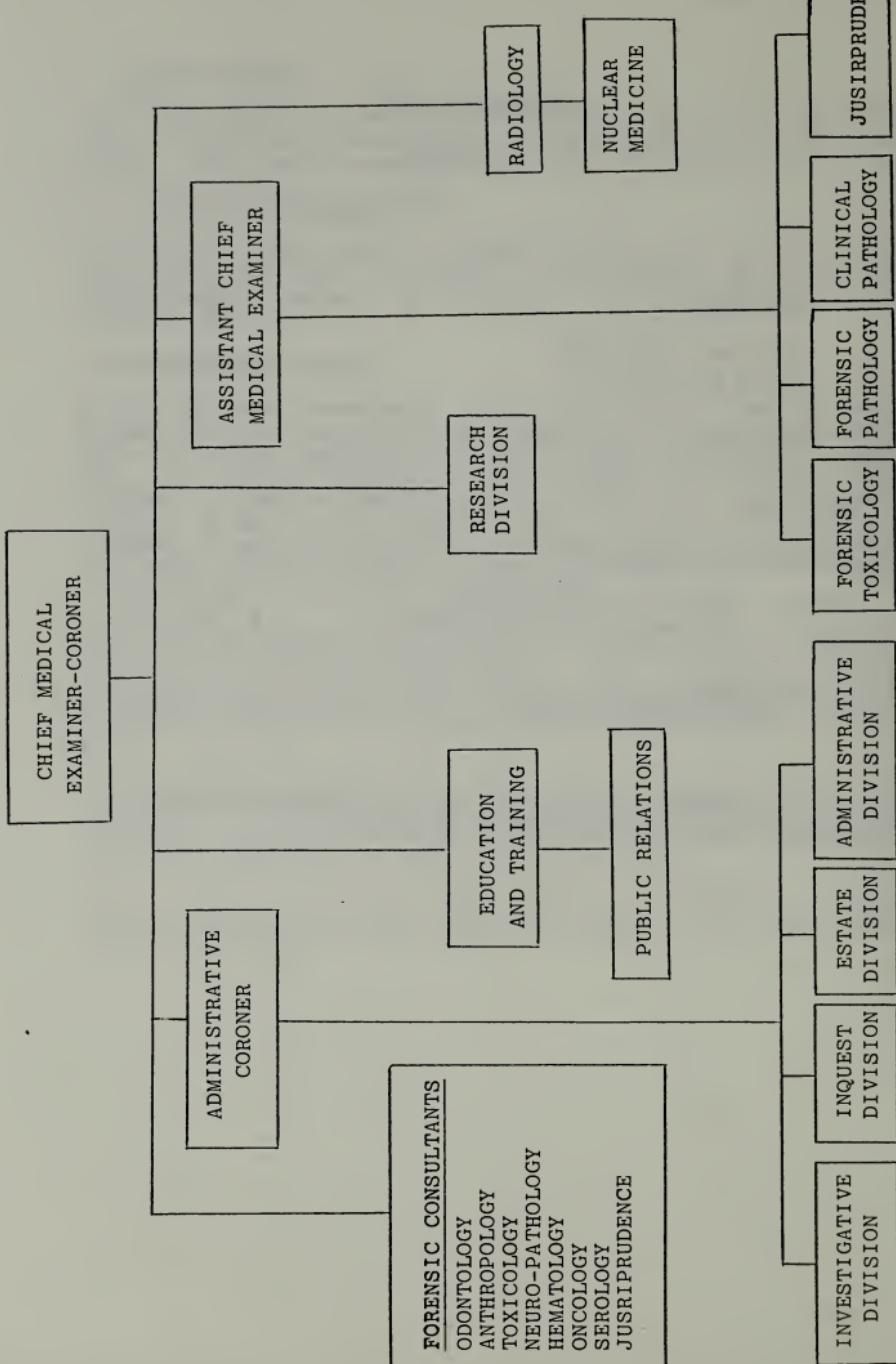
Forensic medicine serves many useful purposes in a community. It is our goal to have a worthwhile and widely beneficial program in this county for both the living and the dead.

DEPARTMENTAL COSTS

1987 - 1988

Total Budget	\$1,938,624.00
Transfers to controller, Health and Retirement	\$ 341,372.00
NET BUDGET (all other costs)	1,597,252.00
Total Cases	4,492
Cost per case investigated	\$ 356.00
Revenues (sales of records, public auctions, fee-for-service work)	\$ 39,074.00
Total Costs <u>Ad Valorum Taxes</u> <u>per case investigated</u>	\$ 347.00

As indicated elsewhere, this includes all investigative, administrative, scientific and expert witness costs to the County.



City & County of San Francisco  
Chief Medical Examiner/Coroner's  
Office  
Function and Organization Chart  
Date: June 1985

CHIEF MEDICAL EXAMINER-CORONER'S OFFICE

- Directs operation of the department
- Investigates and medically evaluates all deaths where causes are undetermined
- Establishes procedure and work standards
- Directs and evaluates effectiveness of professionals
- Develops inquests and examines witnesses
- Presides at inquests and examines witnesses
- Testifies in court as expert witness

(1) CHIEF MEDICAL EXAMINER/CORONER (2564)

ADMINISTRATIVE & INVESTIGATIVE DIVISION

- Assists in directing the administrative and legal activities and functions
- Acts for Medical Examiner in his absence
- Develops and enforces departmental policies

(1) Administrative Coroner (2581)

INVESTIGATIVE SECTION

- Investigates circumstances of death under jurisdiction of Medical Examiner
- Takes charge of bodies, evidence and valuables
- Notifies next of kin or legal representative
- Prepares detailed reports
- Operates ambulance
- Fingerprints deceased persons

(11) CORONER'S INVESTIGATORS (2580)

STENOGRAPHIC SECRETARY

- Performs highly specialized stenographic/secretarial abilities
- Serves as confidential secretary

(1) Stenographic Secretary (1452)

ESTATE SECTION

- Receives, accounts for and transfers personal property acquired by investigations
- Assigns and reviews work of clerical staff
- Assists with preparation of budget
- Assists with all purchases and payment for operation of office
- Handles confidential files & mail

(1) MANAGEMENT ASSISTANT (1842)

INVESTIGATIVE SECTION

- Investigates circumstances of death under jurisdiction of Medical Examiner
- Takes charge of bodies, evidence and valuables
- Notifies next of kin or legal representative
- Prepares detailed reports
- Operates ambulance
- Fingerprints deceased persons

(11) CORONER'S INVESTIGATORS (2580)

CLINICAL & FORENSIC PATHOLOGY SECTION

- Performs autopsies
- Dictates medical findings and prepares death case records and reports
- Confers with courts, police and district attorney
- Performs routine clinical laboratory tests relating to pathogenic microbes or other specimens
- Performs specialized identification work on badly decomposed bodies
- Maintains laboratory and autopsy rooms
- Conducts Forensic Medical Seminars and lectures

(2) SENIOR PHYSICIAN SPECIALISTS (2232)  
(1) TOXICOLOGIST  
(1) ASSISTANT TOXICOLOGISTS (2458)  
(1) LABORATORY CLERK  
(1) STAFF ASSISTANT (2456)  
(2) POST M.D. VI (2283)  
(2) CLINICAL LABORATORY TECH. (2424)  
(13) FORENSIC AUTOPSY TECH. (2523)

INQUEST SECTION

- Records testimony at all inquests
- Arranges for transcription of inquest testimony
- Records depositions

(1) COURT REPORTER (P.T.) (8138)

CLERICAL SECTION

- Transcribes medical reports from dictation equipment
- Operates Word Processing equipment
- Types case histories, mail, files all correspondence related to cases
- Assists public relative to deaths in office and telephones

(4) MEDICAL TRANSCRIBER TYPISTS (1440)  
(1) MEDICAL CLERK STENOGRAFHER (1464)

MEDICAL EXAMINER CASES FOR 1987-88

In the fiscal year 1987-88, there were 8,498 deaths in San Francisco County. Of these deaths, 4,492 were reported to the San Francisco Medical Examiner-Coroner's Office. The Coroner's Investigators examined the previous medical history, circumstances surrounding the deaths and, in many cases, the scene of the death and determined that 1,761 of these deaths came under the jurisdiction of this office. Autopsies were performed on 78% of these cases.

1. The highest total number of deaths occurred in April, 1988, while the highest number for each manner of death occurred during other months (e.g. highest number of accidents in May, highest number of suicides in June). See Table I, page 13.
2. The racial distribution for each manner of death was quite variable. For example, the value of the ratio of whites/blacks was 3.6 for accidents, 13.6 for suicides and 1.0 for homicides. See Table II, page 13.
3. The age range distribution for each manner of death was also variable. For example, the highest number of accidental deaths occurred in the 30-39 year age group, while the highest number of suicides occurred in the 20-29 year age group. See Table III, page 14.
4. The overall distribution of deaths by sex (ratio of male/female) was 2.3, but this varied by manner of death from 1.3 in vehicular deaths to 4.1 in suicidal deaths. See Table IV, page 14.

FISCAL YEAR 1987-88

Total Deaths in County	8,498
Total Deaths Reported to Medical Examiner	4,492
Cases Reported, Investigated and Cleared by the Medical Examiner for physician's signature	2,731
Medical Examiner's Cases	1,761
% Reported to Medical Examiner	52.9
% County Deaths Having Medical Examiner's Jurisdiction	20.7

Cases Accepted by Medical Examiner (By manner of death)\*

1. Natural Deaths (NC)	1,052	(59.7%)
2. Accidents (ACC)	319	(18.1%)
3. Suicides (SUI)	162	(9.2%)
4. Homicides.(HOM)	123	(7.0%)
5. Mode Equivocal (EQ)	54	(3.1%)
6. Cause Unknown (UNK)	28	(2.6%)
7. Sudden Infant Death Syndrome (SIDS)	22	(1.2%)
8. Private Autopsies	18**	

\*\*Not included in above figures.

Autopsies performed	1,365
---------------------	-------

Autopsy Index	78%
---------------	-----

Burials Authorized by Medical Examiner

1. Indigents and fetuses buried by City	197
2. Cases buried by funeral home with Public Administrator-controlled funds	54

Inquests Held or Depositions Taken	27
------------------------------------	----

Identification

1. Persons brought to Medical Examiner's Office with insufficient identification	218
2. Persons subsequently identified by fingerprints, dental X-rays or other means	212
3. Persons buried as unidentified	6
4. Fingerprints taken and forwarded to FBI, CII, or SFPD	1,641

\* The abbreviations following each manner of death will be used in most tables in this report.

MEDICAL EXAMINER CASES FOR 1987-88

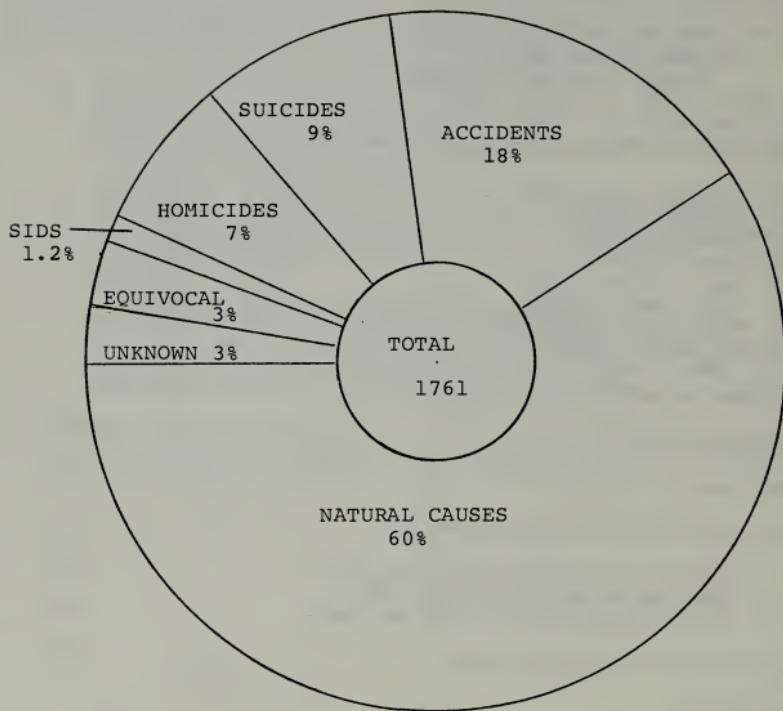


FIGURE 1. PERCENTAGES BY MODE OF DEATH

MEDICAL EXAMINER CASES FOR 1987-88

TABLE I. MANNER OF DEATH - MONTHLY COMPARISON

Month of Death	Manner of Death								TOTALS
	ACC	HOM	SUI	NC	VEH*	SIDS#	EQ	UNK	
July	24	11	12	74	6	3	4	3	137
August	19	12	15	84	5	1	5	3	144
September	16	7	12	84	3	2	7	4	135
October	21	11	11	94	6	2	2	7	154
November	21	9	13	90	6	4	4	1	148
December	22	11	10	100	4	1	8	1	157
January	20	5	10	81	11	2	7	0	136
February	18	12	16	90	3	1	3	1	144
March	18	7	9	85	8	2	1	1	131
April	27	7	17	98	7	1	8	3	168
May	32	9	17	87	13	2	1	2	163
June	21	9	20	85	2	1	4	2	144
<b>TOTALS</b>	<b>258</b>	<b>110</b>	<b>162</b>	<b>1052</b>	<b>75</b>	<b>22</b>	<b>58</b>	<b>24</b>	<b>1761</b>

TABLE II. MANNER OF DEATH BY RACE

Race	Manner of Death								TOTALS
	ACC	HOM	SUI	NC	VEH*	SIDS#	EQ	UNK	
White	176	46	136	746	45	12	28	22	1211
Black	48	46	10	168	12	8	21	5	322
Asian	28	15	9	104	14	1	4	0	188
Other	6	3	7	14	4	1	1	1	40
<b>TOTALS</b>	<b>258</b>	<b>110</b>	<b>162</b>	<b>1052</b>	<b>75</b>	<b>22</b>	<b>54</b>	<b>28</b>	<b>1761</b>

\* VEH = Vehicular deaths. These include 13 deaths ruled to be homicide and 62 cases ruled to be accidental.

# SIDS = Sudden Infant Death Syndrome

TABLE III. MANNER OF DEATH BY AGE

## Manner of Death

Age Group	ACC	HOM	SUI	NC	VEH*	EQ	UNK	TOTALS
0-11 months	2	1	0	29#	1	3	4	40
1-5 years	8	1	0	0	5	0	0	14
6-12 years	5	2	0	0	2	0	0	9
13-16 years	2	2	1	2	1	1	0	9
17-19 years	3	5	5	0	6	1	0	20
20-29 years	34	27	36	14	12	7	2	132
30-39 years	62	38	28	64	15	19	8	234
40-49 years	42	12	24	107	5	11	6	207
50-59 years	16	11	23	171	10	1	4	236
60-69 years	24	7	19	228	8	6	2	294
70-79 years	32	2	17	271	7	2	0	331
80-89 years	24	2	5	150	2	2	1	186
90+ years	4	0	4	38	1	0	0	47
Unknown	0	0	0	0	0	1	1	2
<b>TOTALS</b>	<b>258</b>	<b>110</b>	<b>162</b>	<b>1074</b>	<b>75</b>	<b>54</b>	<b>28</b>	<b>1761</b>

# Includes 22 SIDS deaths

TABLE IV. MANNER OF DEATH BY SEX

## Manner of Death

Sex	ACC	HOM	SUI	NC	VEH*	SIDS#	EQ	UNK	TOTALS
M	191	87	130	702	43	10	37	21	1221
F	67	23	32	350	32	12	16	6	538
Unknown	0	0	0	0	0	0	1	1	2
<b>TOTALS</b>	<b>258</b>	<b>110</b>	<b>162</b>	<b>1074</b>	<b>75</b>	<b>22</b>	<b>54</b>	<b>28</b>	<b>1761</b>

\* = Vehicular deaths. These include 13 cases ruled to be homicide and 62 cases ruled to be accidental.

YEARLY COMPARISON OF MEDICAL EXAMINER - CORONER'S CASES

Comparisons of manners of death as well as methods used over the last eight fiscal years are presented in this section. The most significant observable differences which have occurred over the last eight years which can be observed in these tabulations include:

1. With regard to manners of death, no striking differences are noted for any one manner of death. There seems to be a definite cyclic nature to the changes seen in the numbers of people dying from each manner over the eight year period. (See Table V, page 16 and Figure 2, page 17).
2. With respect to the methods used in homicide deaths, perhaps most significant is the consistency in the number of vehicular deaths ruled to be homicides over the last six years. Deaths by asphyxiation/strangulation have decreased. Deaths from firearms, traumatic injuries and stabbing decreased in the mid-80's but have subsequently increased (See Table VI, page 18).
3. The number of suicide deaths due to poisoning (drugs, toxic substances, etc.) has decreased over the last eight years. During the same period, the number of deaths ruled to be suicide by hanging or by jumping from the Golden Gate Bridge has remained remarkably constant (See Table VII, page 19).
4. A very striking finding in the deaths ruled to be accidental is the steady increase in deaths due to drugs, with more than a doubling in the number over the eight year period. The number of deaths due to aspiration has decreased by one-half over the same period. The number of deaths by drowning shows an increase, part of which may be accounted for by near-drowning patients who are brought to the City for hospital treatment and who subsequently succumb in San Francisco. The number of deaths from falls remains high and is second only to deaths from drugs as leading cause of accidental deaths (See Table VIII, page 19).

YEARLY COMPARISONS OF MEDICAL EXAMINER-CORONER'S CASES

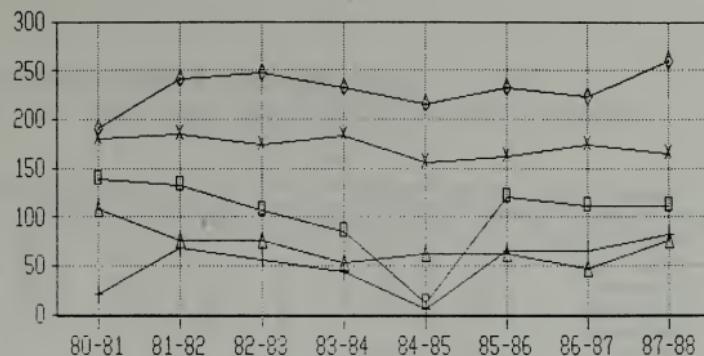
TABLE V. YEARLY COMPARISON OF MANNER OF DEATH

Fiscal year

Manner of Death	'80-'81	'81-'82	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88
Accident	191	240	245	230	214	231	222	258
Homicide	136	132	103	84	95	120	110	110
Suicide	179	183	173	182	153	161	171	162
Natural	1112	1139	1154	1082	1210	1150	1040	1074
Vehicular*	106	74	74	51	60	61	46	75
Undetermined	19	67	55	42	55	63	62	82
TOTALS	1815	1835	1804	1671	1787	1786	1651	1761

\* Vehicular deaths include 13 cases ruled to be homicide and 62 cases ruled to be accidental.

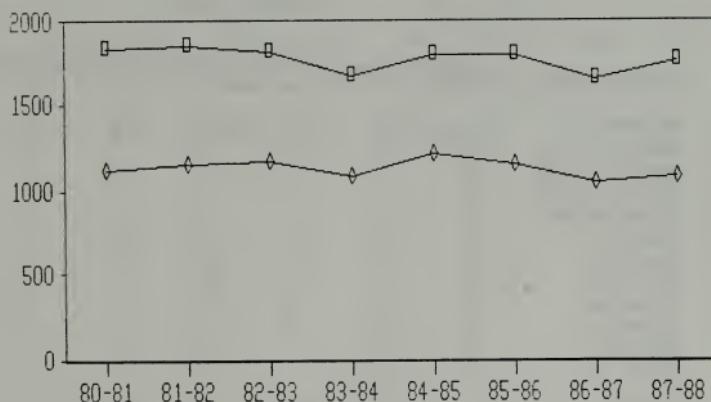
# YEARLY COMPARISON OF MANNER OF DEATH



YEAR

—○— ACCIDENT      —□— HOMICIDE      —×— SUICIDE      —+— UNDETERMINED

—●— VEHICULAR



YEAR

—○— NATURAL      —□— TOTALS

Figure 2.

TABLE VI. YEARLY COMPARISON OF HOMICIDE METHODS USED

Fiscal year

Method Used	'80-'81	'81-'82	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88
Asphyxiation	9	12	12	8	8	8	8	3
Traum. Inj.	17	14	5	5	19	18	21	23
Firearms	63	64	47	27	26	40	41	48
Stabbing	38	33	28	26	31	34	32	35
Vehicular	-	-	10	10	7	11	7	13
Other	5	9	1	5	4	9	1	1
TOTALS	136	132	103	84	95	120	110	123

TABLE VII. YEARLY COMPARISON OF SUICIDE METHODS USED

Fiscal year

Method Used	'80-'81	'81-'82	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88
Poisoning	55	50	46	38	34	36	32	32
Jump/GG Brdg	21	18	22	19	18	17	19	18
Jump/Bay Brdg	0	1	1	2	0	0	1	1
Jump/Building	13	20	16	23	15	16	19	19
CO Poisoning	7	4	7	4	8	6	6	2
Asphyxia	0	2	2	1	1	2	3	7
Hanging	23	27	26	28	29	28	29	28
Cut/stab	8	8	7	10	4	5	9	8
Firearms	36	48	36	48	34	46	45	42
Drowning	6	2	9	1	0	3	6	3
Burning	3	1	6	2	0	1	0	0
Other	7	2	1	2	10	1	2	2
TOTALS	179	183	179	178	153	161	171	162

TABLE VIII. YEARLY COMPARISON OF ACCIDENTAL\* DEATH SITUATIONS

Fiscal year

Situation	'80-'81	'81-'82	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88
Drugs/Poisons	41	44	71	66	78	96	92	100
Aspiration	20	24	21	9	14	7	8	10
Drowning	8	13	12	3	6	9	5	14
Asphyxia	-	-	3	3	2	6	4	2
Firearms	2	3	1	1	1	2	1	1
Smoke inhal.	10	8	3	1	3	0	9	8
Burns	20	24	38	33	14	15	6	12
Falls	73	97	68	82	74	67	80	76
Med. Misadv.	-	-	-	-	-	-	12	13
Hanging	-	-	-	-	-	-	-	2
Drug/Alcohol Abuse Rel.	-	-	-	-	-	-	-	13
Other	17	27	28	35	22	29	3	7
TOTALS	191	240	245	230	214	231	222	258

\* Vehicular deaths are not included in this tabulation.

VIOLENT DEATHS

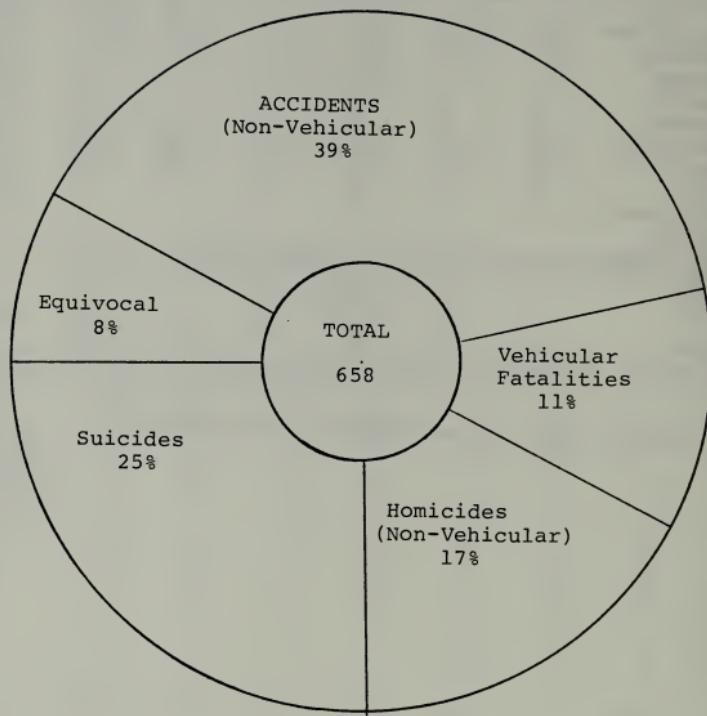


Figure 3.

TABLE IX. VIOLENT DEATHS

Of the 1,761 deaths investigated by the Coroner's Office during 1987-88, 658 were determined to be the result of violence.

<u>Mode</u>	<u>Total No.</u>	<u>% of Coroner's Cases</u>	<u>% of County Deaths</u>
ACCIDENT	319	18.1	3.8
Vehicular	61	3.5	
Non-vehicular	258	14.7	
SUICIDE	162	9.2	1.9
HOMICIDE	123	7.0	1.4
Vehicular	13	0.7	
Non-vehicular	110	6.2	
EQUIVOCAL	54	3.1	0.6

## ACCIDENTAL DEATHS

Three hundred and nineteen deaths were ruled to have been due to accidental means during the 1987-88 fiscal year. The number of individuals dying by each manner of accidental death are indicated in Table X, page 24, and the percentages of all accidental deaths represented by each manner are indicated on Table X and Figure 4, page 23.

Of the accidental death victims tested for alcohol and drugs (e.g. those in the hospital for less than 24 hours), a large percentage had significant levels of alcohol in their blood as well as having drugs present (See Table X, page 24).

### Abuse Drug Involvement (Table XI, page 25).

In the deaths caused by drugs, heroin was seen most frequently, followed closely in number of cases by cocaine. Abuse drugs may have played a role in accidental deaths by falls (4 cases), drowning (4 cases) and hanging (1 case).

### Racial Distribution (Table XII, page 26).

Overall, accidental deaths occurred most frequently in whites. This also was true for all accidental death situations separately. Accidental deaths by drug overdose appear to occur more frequently in blacks and less frequently in Asians than would be anticipated by the overall involvement of these racial groups in accidental deaths. Also, Asians are more heavily represented in vehicular deaths and deaths by medical misadventure than would be expected based on their general involvement in all accidents.

### Age Distribution (Table XIII, page 27).

Deaths due to aspiration and burns appear to occur more frequently in the youngest age group (0-5 years) and in the older age groups (70+ years for aspiration and 50-79 years for burns) than in any other age groups. Deaths from drowning occur most frequently in the younger age groups (12 years and younger while falls occur predominantly (71%) in those older than 60 years. Deaths due to drug overdoses are concentrated in the 20-49 year age group with 88% of these in those 30-39 years old. However, vehicular deaths are seen to be distributed across all age groups.

### Distribution by Sex (Table XIV, page 28).

Males are more than twice as likely as females to be the victims of accidental deaths. This difference is even more pronounced in deaths due to asphyxiation, drowning, firearms, hanging and drug overdoses. This difference is less pronounced in vehicular deaths and deaths due to medical misadventure.

### NON-VEHICULAR ACCIDENTS

This category includes all unintentional fatalities. There were 258 accidental deaths which accounted for 18% of the Medical Examiner death investigations for the fiscal year of 1987-88.

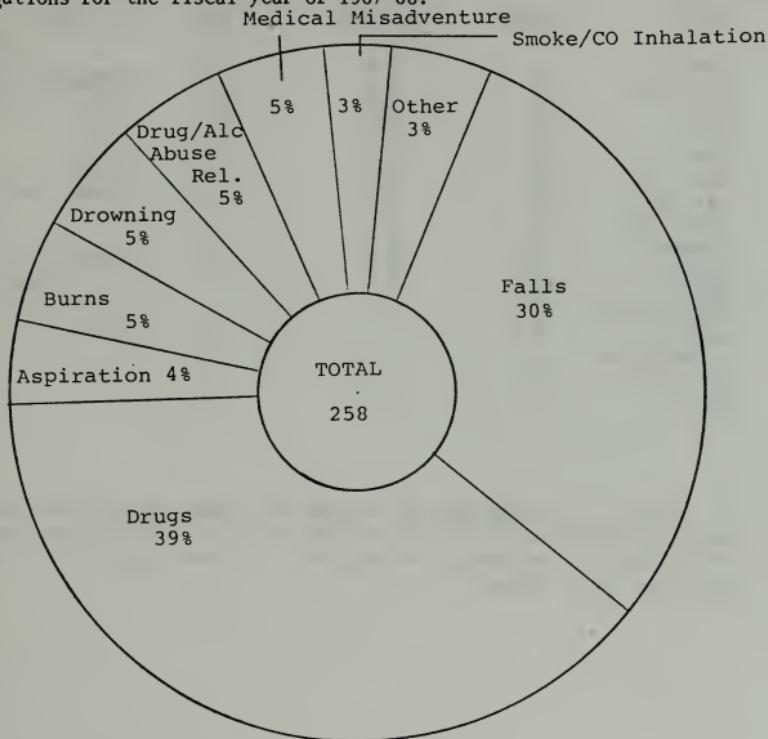


Figure 4.

TABLE X. ACCIDENTAL DEATHS BY MODE

Drug and Alcohol Involvement

METHOD	NUMBER	% OF TOTAL ACCIDENTS	% ALC.*	AVE. ALC. CONC (g%)	% DRUGS**
ASPHYXIA	2	0.6	0	-	0
ASPIRATION	10	3.1	25	0.20%	100
BURNS	12	3.8	50	0.13%	0
FALLS	76	23.8	37	0.21%	25
DROWNING	14	4.4	33	0.18%	71
DRUG O.D.	100	31.3	46	0.18%	100
DRUG/ALC	13	4.1	29	0.28%	100
ABUSE REL.					
FIREARMS	1	0.3	0	-	0
HANGING	2	0.6	50	0.07%	100
MEDICAL	13	4.1	-	-	-
MISADVENTURE					
SMOKE/CO INHALATION	8	2.5	25	0.16%	13
VEHICULAR	61	19.1	24	0.21%	28
OTHER	7	2.2	0	-	0

\* Refers to percentage of victims (of those tested) with positive blood ethyl alcohol levels.

\*\* Refers to percentage of victims (of those tested) with positive blood tests for abuse drugs.

TABLE XI. ABUSE DRUGS PRESENT IN NON-VEHICULAR ACCIDENTS

<u>Situation</u>	<u>DRUGS</u>			
	<u>Cocaine</u>	<u>PCP</u>	<u>Morphine</u>	<u>Amphe tamin es</u>
ASPHYXIA/SUFFOCATION	0	0	0	0
ASPIRATION	0	0	0	0
BURNS	0	0	0	0
FALLS	2	1	1	0
DROWNING	1	1	0	2
DRUG/ALCOHOL ABUSE REL.	5	1	4	2
FIREARMS	0	0	0	0
HANGING	1	0	0	0
MEDICAL MISADVENTURE	0	0	0	0
DRUG OVERDOSE	41	1	47	21
SMOKE/CO INHALATION	0	0	0	0
OTHER	0	0	0	0
TOTALS	50	4	52	25

\* Drugs may have been present singly or in combination

\*\* Drugs used therapeutically are not included in this tabulation

TABLE XII. ACCIDENTAL DEATH SITUATIONS BY RACE

	<u>Race</u>				
	<u>White</u>	<u>Black</u>	<u>Asian</u>	<u>Other</u>	<u>Total</u>
<u>Method</u>					
Asphyxia	2 (100%)*	0	0	0	2
Aspiration	6 (60%)	1 (10%)	2 (20%)	1 (10%)	10
Burns	8 (66.7%)	3 (25%)	1 (8.3%)	0	12
Falls	55 (72.4%)	7 (9.2%)	12 (15.8%)	2 (2.6%)	76
Drowning	10 (83.3%)	2 (16.7%)	2 (16.7%)	0	14
Drug/Alcohol	9	3	1	0	13
Abuse Rel	(69.2%)	(23.1%)	(7.7%)		
Firearms	0	1 (100%)	0	0	1
Hanging	2 (100%)	0	0	0	2
Medical	8	0	4 (30.8%)	1 (7.7%)	13
Misadventure	(61.5%)				
Drug O.D.	67 (67%)	28 (28%)	3 (3%)	2 (2%)	100
Smoke/CO	5	2	1	0	8
Inhalation	(62.5%)	(25%)	(12.5%)		
Vehicular	35 (57.4%)	10 (16.4%)	13 (21.3%)	3 (4.9%)	61
Other	4 (57.1%)	1 (14.3%)	2 (28.6%)	0	7
Totals	211 (65.8%)	58 (18.2%)	41 (12.9%)	9 (2.8%)	319

\* Row percentages refer to percentages by race for each mode. These can be compared to total percentages for each race to see whether a mode is more or less prevalent in a racial group. For instance, drowning appears to occur more frequently in whites (83.3%) than the general involvement of whites in accidents (65.8%), while drug overdose in Asians (3%) occur less frequently than all accidents in Asians.

TABLE XIII. ACCIDENTAL DEATH SITUATIONS BY AGE

Method	Age Range										
	0-5	6-12	13-16	17-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
Asphyxia	1	0	0	0	1	0	0	0	0	0	0
	(50%)*				(50%)						
Aspiration	1	0	0	1	0	0	1	0	1	4	2
	(10%)			(10%)			(10%)		(10%)	(40%)	(20%)
Burns	1	0	0	0	1	1	1	2	2	3	1
	(8%)				(8%)	(8%)	(8%)	(17%)	(17%)	(25%)	(8%)
Falls	1	1	0	1	5	9	4	1	15	15	24
	(1%)	(1%)		(1%)	(7%)	(12%)	(5%)	(1%)	(20%)	(20%)	(32%)
Drowning	5	1	0	0	2	2	2	0	2	0	0
	(36%)	(7%)			(14%)	(14%)	(14%)				(14%)
Drug/Alc	0	1	0	0	2	4	5	0	1	0	0
Abuse Rel		(8%)			(15%)	(31%)	(39%)				(8%)
Firearms	0	0	1	0	0	0	0	0	0	0	0
			(100%)								
Hanging	0	0	0	0	1	1	0	0	0	0	0
					(50%)	(50%)					
Medical	0	1	0	0	0	2	2	1	1	5	1
Misad.		(8%)				(15%)	(15%)	(8%)	(8%)	(39%)	(8%)
Drug O.D.	0	0	0	1	20	42	24	11	1	1	0
				(1%)	(20%)	(42%)	(24%)	(11%)	(1%)	(1%)	
Smoke/CO	1	1	0	0	1	0	1	0	1	2	0
Inhal.	(14%)	(14%)			(14%)		(14%)		(14%)	(29%)	
Vehicular	4	1	1	4	11	12	5	7	7	6	3
	(7%)	(2%)	(2%)	(7%)	(18%)	(20%)	(8%)	(12%)	(12%)	(10%)	(5%)
Other	0	0	1	0	1	1	1	1	0	2	0
			(14%)		(14%)	(14%)	(14%)	(14%)		(29%)	
TOTALS	14	6	3	7	45	74	46	23	31	38	31
% OF TOTAL	4%	2%	1%	2%	14%	23%	14%	7%	10%	12%	10%

\* Row percents refer to percentage by age range for each mode. These can be compared to total percentages for each age range to see if a mode is more or less prevalent in an age group. For example, drowning appears to occur more frequently in the 0-5 years of age group (36%) than the general involvement of this age group in accidents (4%) while falls in the 20-29 year age group (7%) occur less frequently than all accidents in this age group (14%).

TABLE XIV. ACCIDENTAL DEATH SITUATIONS BY SEX

Method	Sex	
	Male	Female
Asphyxia	2 (100%)*	0
Aspiration	7 (70%)	3 (30%)
Burns	8 (67%)	4 (33%)
Falls	52 (68%)	24 (32%)
Drowning	13 (93%)	1 (7%)
Drug/Alcohol Abuse Related	8 (62%)	5 (39%)
Firearms	1 (100%)	0
Hanging	2 (100%)	0
Medical Misadven.	6 (46%)	7 (54%)
Drug O.D.	82 (82%)	18 (18%)
Smoke/CO Inhal.	6 (75%)	2 (25%)
Vehicular	32 (53%)	29 (47%)
Other	4 (57%)	3 (43%)
TOTALS	223	96
% OF TOTAL	70%	30%

\* Row percents refer to percentages by sex for each mode. These can be compared to total percentages for each sex to see whether a mode is more or less prevalent in one sex. For example, drowning appears to occur more frequently in males (93%) than the general involvement of males in accidents (70%), while drug overdoses in females (18%) occur less frequently than all accidents in females (30%).

## VEHICULAR DEATHS

In the 1987-88 fiscal year, there were seventy-five vehicular fatalities in San Francisco. The number of vehicular fatalities by type are indicated in Table XV, page 31. The percentages of all vehicular fatalities represented by each type are shown on Table XV and Figure 5, page 30. The largest number of vehicular fatalities involved automobile drivers with the second largest number being pedestrians.

Of the vehicular fatalities tested for alcohol and drugs (i.e. those in the hospital for less than 24 hours), auto and motorcycle drivers showed a positive test for ethyl alcohol and drugs, singly and in combination, more frequently than any other specific type of vehicular fatality. Motorcycle drivers had the highest average blood ethyl alcohol concentration, followed by auto drivers and passengers.

### Abuse Drug Involvement (Table XVI, page 31)

Cocaine was the abuse drug most frequently seen in vehicular fatalities (9 cases) followed in frequency by heroin (3 cases). A greater variety of abuse drugs was found in auto drivers than in any other type of vehicular fatality.

### Age Distribution (Tables XVII and XVIII, pages 32 and 33)

The mean age of both motorcycle drivers and passengers dying as traffic fatalities was in the 20-29 year age group while the mean ages of auto drivers and passengers were higher and were distributed more widely over most age groups. The mean age of pedestrians dying as traffic fatalities was the highest seen for any type with the 0-5 year and 70-79 year age groups overrepresented as compared to their overall involvement in traffic fatalities.

### Distribution by Sex (Table XVIII, page 33)

Overall, males were the predominant victims in traffic fatalities. This was most clearly seen in auto and motorcycle drivers and motorcycle passengers. On the other hand, females predominated in the pedestrian type of vehicular fatality.

### Racial Distribution (Table XVIII, page 33)

Overall, vehicular fatalities occur more frequently in whites. This also was true for all types of vehicular fatalities separately. However, blacks were represented more heavily among deaths of motorcycle drivers and Asians were represented much more heavily among the pedestrian deaths than would have been expected by their involvement in all vehicular fatalities.

## VEHICULAR DEATHS

In San Francisco, there were 75 vehicle-related fatalities (62 accidents and 13 homicides), accounting for 4% of the Medical Examiner death investigations for the fiscal year 1987-88.

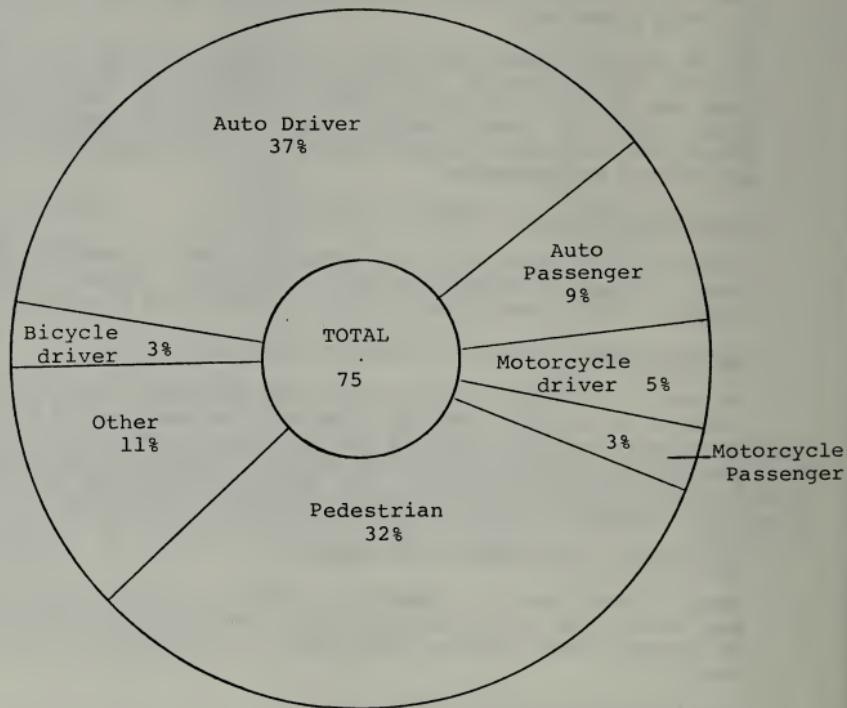


Figure 5.

TABLE XV. VEHICULAR FATALITIES IN 1987-1988

## Drug and Alcohol Involvement

<u>METHOD</u>	<u>NO.</u>	<u>% WITH ALCOHOL*</u>	<u>AVE. ALC. CONC. (g%)</u>	<u>% WITH DRUGS*</u>	<u>% WITH DRUGS+ALC</u>
BICYCLE DRIVER	2 ( 3%)	0	-	50	0
AUTO DRIVER	28 (37%)	42	0.22	42	26
AUTO PASSENGER	7 ( 9%)	17	0.22	0	0
MOTORCYCLE DRIVER	4 ( 5%)	25	0.32	50	25
MOTORCYCLE PASSENGER	2 ( 3%)	-	-	-	-
PEDESTRIAN	24 (32%)	10	0.13	12	0
OTHER/UNKNOWN	8 (11%)	50	0.19	100	100

\* Refers to percentages of victims (of those tested) with positive blood ethyl alcohol levels.

\*\* Refers to percentage of victims (of those tested) with positive blood tests for abuse drugs.

TABLE XVI. ABUSE DRUGS PRESENT IN VEHICULAR FATALITIES

<u>Situation</u>	<u>Drugs</u>				
	<u>Cocaine</u>	<u>PCP</u>	<u>Heroin</u>	<u>Amphetamines</u>	<u>THC</u>
BICYCLE DRIVER	0	0	0	0	1
AUTO DRIVER	4	1	2	1	0
MOTORCYCLE DRIVER	2	0	0	0	0
PEDESTRIAN	2	0	1	0	0
UNKNOWN/OTHER	1	0	0	0	0
TOTALS	9	1	3	1	1

TABLE XVII. VEHICULAR FATALITIES BY AGE

Situation	Age										
	0-5	6-12	13-16	17-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
BICYCLE DRIVER	1	0	0	0	0	1	0	0	0	0	0
	(50%)*					(50%)					
AUTO DRIVER	0	0	0	3	5	7	1	6	4	1	1
				(11%)	(18%)	(25%)	(4%)	(21%)	(14%)	(4%)	(4%)
AUTO PASSENGER	1	1	0	1	1	0	1	1	1	0	0
	(14%)	(14%)		(14%)	(14%)		(14%)	(14%)	(14%)		
MOTORCYCLE DRIVER	0	0	1	0	2	1	0	0	0	0	0
			(25%)		(50%)	(25%)					
MOTORCYCLE PASSENGER	0	0	0	1	1	0	0	0	0	0	0
				(50%)	(50%)						
PEDESTRIAN	3	1	0	0	3	3	2	2	3	6	1
	(12%)	(4%)			(12%)	(12%)	(8%)	(8%)	(12%)	(25%)	(4%)
OTHER/UNKNOWN	1	0	0	1	0	3	1	1	0	0	1
	(12%)			(12%)		(38%)	(12%)	(12%)			(12%)
TOTALS	6	2	1	6	12	15	5	10	8	7	3
% of total	(8%)	(3%)	(1%)	(8%)	(16%)	(20%)	(7%)	(13%)	(11%)	(9%)	(4%)

\* Row percents refer to percentages by age group for each situation. These can be compared to total percentages for each age group to see if a situation is more or less prevalent in one age group. For example, accidental deaths of motorcycle drivers appear to occur more frequently in the 17-19 year age group (50%) than the general involvement of this age group in fatal vehicular accidents (8%), while accidental deaths of pedestrians in the 30-39 year age group (12%) occur less frequently than all vehicular accidents in this age group (20%).

TABLE XVIII. DEMOGRAPHICS OF VEHICULAR FATALITIES

<u>Situation</u>	<u>Sex</u>		<u>Race</u>				<u>Age</u>
	<u>%M</u>	<u>%F</u>	<u>%W</u>	<u>%B</u>	<u>%A</u>	<u>%O</u>	
BICYCLE DRIVER	50	50	100	0	0	0	19
AUTO DRIVER	75	25	61	18	14	7	43
AUTO PASSENGER	57	43	71	14	14	0	31
MOTORCYCLE DRIVER	75	25	75	25	0	0	23
MOTORCYCLE PASS.	100	0	100	0	0	0	21
PEDESTRIAN	38	62	42	17	33	8	47
OTHER/UNKNOWN	38	62	75	13	13	0	38
AVERAGE	57	43	60	16	19	5	40

\* For discussion of meaning of row percentages, see previous page.

## SUICIDES

The determination of suicide as a manner of death represents the summation of scene investigation, including a review of psychological state, autopsy, pathology, toxicology and, frequently, other investigation. To the best of our knowledge, ours is the only Coroner's Office routinely performing toxicology on multiple organs and/or body fluids in order to evaluate the metabolic status of a drug or drugs.

Realizing the immense emotional impact on family, the diagnosis of suicide is never made lightly, and always represents a decision made on the basis of data sufficient to defend that decision in a court of law, if necessary. Should these data be inconclusive, the victim automatically gets the benefit of the doubt.

Suicide takes a tremendous toll of our young people. The relative number jumping from the Golden Gate bridge would not seem to warrant the publicity assigned them as compared to the evident need for help for individuals using other methods.

To help understand the problem, and, hopefully, to aid in reduction of suicides, this office has supported suicidology research and prevention programs for many years. It is hoped that this work will help to reduce this needless loss.

The majority of these deaths are situational reactions, and, given momentary trained support, are potentially preventable.

## SUICIDAL DEATHS

One hundred and sixty-two deaths were ruled to have been due to suicide during the 1987-88 fiscal year. The number of individuals dying by each method of suicide are presented in Table XIX, page 37, and the percentages of all suicidal deaths by type are indicated in Table XIX and Figure 6, page 36. Of the individuals dying by suicide who were tested for alcohol and drugs (i.e. in the hospital for less than 24 hours), less than 50%, on the average, had positive blood tests for alcohol and/or drugs. In those who did test positive for ethyl alcohol, the average alcohol concentrations were all higher than that level considered to be indicative of an individual driving under the influence of alcohol (0.10 g%).

### Abuse Drug Involvement (Table XX, page 37)

Of the deaths caused by drugs, heroin was the most frequently observed drug. The largest number of deaths (8) in which abuse drugs were present were those caused by firearms. Abuse drugs may have played a role in suicidal deaths by hanging (4 cases) and by jumping (4 cases).

### Racial Distribution (Table XXI, page 38)

Deaths from suicide occurred most frequently in whites (83% of total suicides). This was also true for all modes of suicide separately. The white racial group has been divided into Hispanic and non-Hispanic in this tabulation. It can be seen that the white Hispanic group was involved in only 9% of total suicides but in 21% of all suicides by hanging while white non-Hispanics, who were involved in 74% of all suicides, were only involved in 46% of suicides by hanging. The mode of hanging was also used more frequently by Asians than would have been expected by the overall percentage of suicides by Asians. Deaths by asphyxiation and by jumping from the Golden Gate Bridge were more prevalent in non-Hispanic whites than would have been expected from the overall percentage of suicides by this group.

### Age Distribution (Tables XXII and XXIII, pages 39 and 40)

There were no deaths by suicide in the 0-12 year age group during this fiscal year. There were 6 suicides in the 13-19 age group which is the average number of suicides for this age group over the last 7 fiscal years. Deaths by hanging appear to be the method of choice for this age group with 4 of 6 or 67% of the suicide victims of this age dying by this method. The 20-29 year age group has the highest percentage of suicides of any age group with deaths from drug overdoses and jumping from the Golden Gate Bridge being particular prevalent in this age group. Asphyxiation appears to be a mode of suicide used predominantly by older adults with 56% of the deaths by asphyxiation being in the 60+ age group. Deaths by drug overdose, jumping, and firearms are generally spread over all age groups.

### Distribution by Sex (Table XXIV, page 41)

Males were four times more likely, on the average, than females, to commit suicide in 1987-88. This difference was even more pronounced in all separate manners of suicidal deaths except for drowning, carbon monoxide poisoning, and drug overdoses.

## SUICIDES

Suicides are self-inflicted deaths. In San Francisco, 162 suicides occurred, accounting for 9% of the Medical Examiner death investigations for the fiscal year of 1987-88.

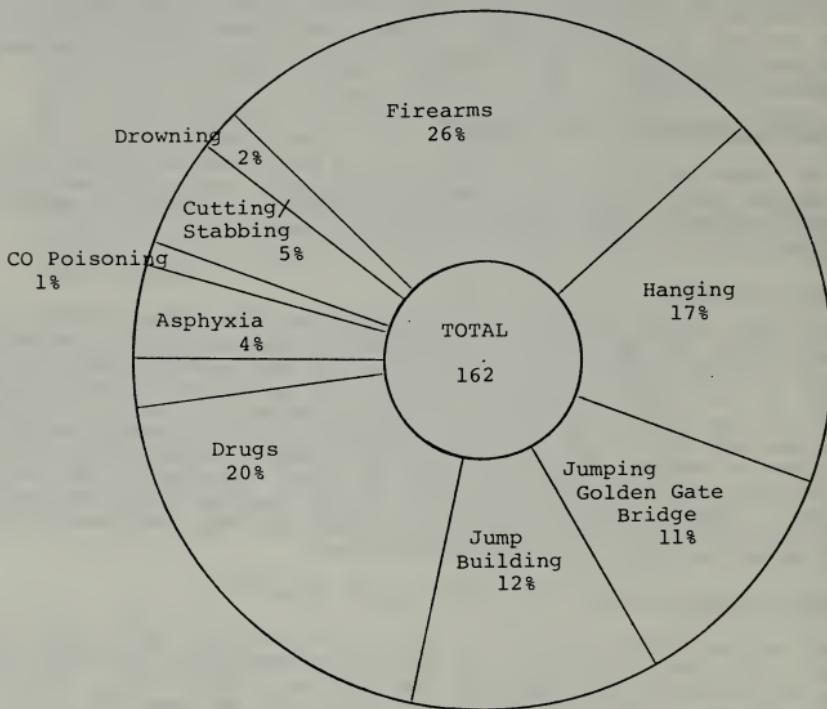


Figure 6.

TABLE XIX. SUICIDAL DEATHS BY MODE

## Drug and Alcohol Involvement

METHOD	NUMBER	% OF TOTAL SUICIDES	% WITH ALCOHOL	AVE. ALC. CONC.(g%)	% WITH DRUGS
ASPHYXIA/ SUFFOCATION	7	4.3	29	0.18%	50
CO POISONING	2	1.2	0	-	0
CUTTING/STABBING	8	4.9	38	0.12%	14
DROWNING	3	1.9	0	-	0
FIREARMS	42	25.9	31	0.20%	26
HANGING	28	17.3	37	0.14%	16
JUMP-BAY BRIDGE	1	0.6	100	0.15%	100
JUMP-BUILDING	19	11.7	11	0.25%	17
JUMP-GG BRIDGE	18	11.1	22	0.14%	9
MULT. TRAUM. INJ.	2	1.2	0	-	0
DRUG OVERDOSE	32	19.8	29	0.13%	-

TABLE XX. ABUSE DRUGS PRESENT IN SUICIDAL DEATHS

## Drugs

Situation	Cocaine	PCP	Morphine	Amphetamines
ASPHYXIA/SUFFOCATION	0	0	0	0
AUTO/CO POISONING	0	0	0	0
CUTTING/STABBING	0	0	0	0
DROWNING	0	0	0	0
FIREARMS	3	1	2	2
HANGING	1	1	0	2
JUMP-BAY BRIDGE	1	0	0	0
JUMP-BUILDING	1	0	0	0
JUMP-GG BRIDGE	2	0	0	0
MULT. TRAUM. INJ.	0	0	0	0
DRUG OVERDOSE	1	1	5	0
TOTALS	9	3	8	5

TABLE XXI. SUICIDE METHODS BY RACE

<u>Method</u>	<u>Race</u>					<u>Total</u>
	<u>W-NH</u>	<u>W-H</u>	<u>B-NH</u>	<u>Asian</u>	<u>Other</u>	
Asphyxia/Suffoc.	6 (86%)	0	0	1 (14%)	0	7
CO Poisoning	2 (100%)	0	0	0	0	2
Cutting/Stabbing	8 (100%)	0	0	0	0	8
Drowning	3 (100%)	0	0	0	0	3
Firearms	33 (79%)	3 (7%)	2 (5%)	3 (7%)	1 (2%)	42
Hanging	13 (46%)	6 (21%)	3 (11%)	4 (14%)	2 (7%)	28
Jump-Bay Brdg	0 (100%)	1	0	0	0	1
Jump-Building	14 (74%)	1 (5%)	1 (5%)	0	3 (16%)	19
Jump-GG Brdg	15 (83%)	0	1 (6%)	0	2 (11%)	18
Mult. Traum. Inj.	1 (50%)	0	1 (50%)	0	0	2
Drug O.D.	25 (78%)	3 (9%)	2 (6%)	1 (3%)	1 (3%)	32
TOTALS (NO.)	120	14	10	9	9	162
% OF TOTALS	74%	9%	6%	6%	6%	

\* Row percentages refer to percentages by race for each method. These can be compared to total percentages for each race to see whether a method is more or less prevalent in a racial group. For instance, stabbing appears to occur more frequently in white/non-Hispanics (100%) than the general involvement of white/non-Hispanics in suicides (74%), while drug overdoses in Asians (3%) occurs less frequently than all suicides in Asians (6%).

TABLE XXII. SUICIDE METHODS BY AGEAge

<u>Method</u>	<u>13-16</u>	<u>17-19</u>	<u>20-29</u>	<u>30-39</u>	<u>40-49</u>	<u>50-59</u>	<u>60-69</u>	<u>70-79</u>	<u>80-89</u>	<u>90-99</u>
Asphyxia/Suffoc.	0	0	1 (14%)	0	2 (29%)	0	1 (14%)	1 (14%)	1 (14%)	1 (14%)
CO Poisoning	0	0	1 (50%)	0	0	1 (50%)	0	0	0	0
Cutting/Stabbing	0	0	1 (12%)	3 (38%)	1 (12%)	3 (38%)	0	0	0	0
Drowning	0	0	0 (33%)	0	1 (33%)	1 (33%)	1 (33%)	0	0	0
Firearms	0	1 (2%)	6 (14%)	4 (10%)	8 (19%)	8 (19%)	6 (14%)	6 (14%)	1 (2%)	2 (5%)
Hanging	1 (4%)	3 (11%)	5 (18%)	6 (21%)	4 (14%)	1 (4%)	5 (18%)	2 (7%)	0	1 (4%)
Jump-Bay Bridge	0	0	1 (100%)	0	0	0	0	0	0	0
Jump-Building	0	0	4 (21%)	2 (11%)	3 (16%)	3 (16%)	3 (16%)	2 (11%)	2 (11%)	0
Jump-GG Bridge	0	1 (6%)	7 (39%)	6 (33%)	1 (6%)	0	2 (11%)	1 (6%)	0	0
Mult. Traum. Inj.	0	0	0 (50%)	1 (50%)	0 (50%)	1 (50%)	0 (50%)	0 (50%)	0 (50%)	0 (50%)
Drug Overdose	0	0	10 (31%)	6 (19%)	4 (13%)	5 (16%)	1 (3%)	5 (16%)	1 (3%)	0
TOTAL NO.	1	5	36	28	24	23	19	17	5	4
% OF TOTAL	1%	3%	22%	17%	15%	14%	12%	10%	3%	3%

\* Row percents refer to percentage by age range for each method. These can be compared to total percentages for each age range to see if a method is more or less prevalent in an age group. For example, jumping from the Golden Gate Bridge appears to occur more frequently in the 20-29 years of age group (39%) than the general involvement of this age group in suicides (22%) while drug overdoses in the 60-69 year age group (3%) occur less frequently than all suicides in this age group (12%).

SUICIDESTABLE XXIII. AGE RANGES - COMPARISON BY YEAR

<u>Age Range</u>	<u>'81-'82</u>	<u>'82-'83</u>	<u>'83-'84</u>	<u>'84-'85</u>	<u>'85-'86</u>	<u>'86-'87</u>	<u>'87-'88</u>
0 - 19	7	9	4	7	7	2	6
20 - 29	56	37	34	27	29	22	36
30 - 39	48	48	44	37	46	45	28
40 - 49	26	20	21	25	18	28	24
50 - 59	13	20	26	20	18	30	23
60 - 69	17	17	20	21	19	20	19
70 - 79	12	18	18	15	12	12	17
80 - 89	3	9	12	4	10	9	5
90 - 99	1	2	3	2	2	3	4

TABLE XXIV. SUICIDE METHODS BY SEX

Method	Sex	
	Male	Female
Asphyxia/Suffocation	6 ( 86%)	1 ( 14%)
CO Poisoning	0 ( 0%)	2 (100%)
Cutting/Stabbing	8 (100%)	0 ( 0%)
Drowning	2 ( 67%)	1 ( 33%)
Firearms	36 ( 86%)	6 ( 14%)
Hanging	13 ( 86%)	4 ( 14%)
Jump-Bay Bridge	1 (100%)	0 ( 0%)
Jump-Building	16 ( 84%)	3 ( 16%)
Jump-GG Bridge	16 ( 89%)	2 ( 11%)
Mult. Traum. Inj.	2 (100%)	0 ( 0%)
Drug Overdose	19 ( 59%)	13 ( 41%)
TOTALS	130 (80%)	32 (20%)

\* Row percents refer to percentages by sex for each mode. These can be compared to total percentages for each sex to see whether a mode is more or less prevalent in one sex. For example, stabbing appears to occur more frequently in males (100%) than the general involvement of males in suicides (80%), while jumping from the Golden Gate Bridge in females (11%) occurs less frequently than all suicides in females (20%).

## HOMICIDE

Homicide is the killing of one human by another. Murder is the unlawful killing of a human being with malice. The following data do not differentiate homicide as to whether it was justifiable, accidental, or murder. Such distinctions are the proper function of the judicial system and are not the responsibility or function of this office.

Any judicial system dealing with crimes involving death requires a welltrained staff and well-equipped Medical Examiner-Coroner's Office that can and will interpret the forensic findings in an unbiased, fair manner. This investigation must be intense, accurate and rapid enough so that the charges against one or more individuals may be pursued or dismissed without unfairly affecting their constitutional rights. This is the purpose of this office.

The proper evaluation and investigation of a homicide begins, naturally, at the scene. In the majority of cases, a member of this office (either the Coroner's investigator, Administrative Coroner, or Medical Examiner), determines whether a death is a potential homicide. It has been well-documented that, if such a determination is made by an individual inexperienced or untrained in death investigation, his opinion will be wrong in 50% of the cases. Such a person is very apt to miss the subtle homicide and is more inclined to miscall a natural or accidental death as homicide, resulting in false arrest, false accusations, needless expenditure of public funds, waste of investigative time and delay in the investigation of other deaths.

The Coroner's Investigator responds to the scene of death and determines whether the Police Homicide Detail will be called. When homicide is obvious, the Coroner's Investigator responds as part of a team (other members include homicide investigators, photographers and criminologists). This office is responsible for the body, identification, inquiry into circumstances, manner and means of death (Gov. Code 27491.2). Beside the scene investigation, the Coroner's Investigator is responsible for recovering property, locating and notifying next of kin, and preparing a written summary of his investigation.

In about one-third to one-half of the homicides, a forensic pathologist responds to the scene, aiding in the investigation. The subsequent autopsy, including photography, may also use fluoroscopy, X-ray, angiography and other techniques to establish and define the number, nature and severity of wounds, to obtain evidence (i.e. bullets) and to prepare an official report. This report, including chemistry, serology and toxicology results, is used as part of the prosecution or defense of the case in the formal judicial hearing.

Pertaining to criminal trial, our judicial system requires identification of an individual and presentation of evidence, usually by virtue of expert testimony, relative to the cause of death or trauma associated with death. The Medical Examiner-Coroner's Office identifies the body, frequently relying on local police, CII, or FBI fingerprints. Expert forensic testimony is given by

the Forensic Pathologist from this office. In addition, the Forensic Toxicologist is frequently called upon to testify on the significance and effect of various drug levels, a matter of great importance when dealing with the concept of diminished capacity.

Of minor, but increasing importance, is the fact that, because of San Francisco's excellent and advanced medical facilities, we are seeing more homicide and trauma cases transferred into the County for medical therapy. Should these individuals die, the autopsy and court testimony are done by this office.

## HOMICIDE DEATHS

One hundred and twenty-three deaths were ruled to have been due to homicide during the 1987-88 fiscal year. The number of individuals dying by each manner of death by homicide are indicated in Table XXV, page 46, and the percentage of all homicides represented by specific method used are indicated in Table XXV and Figure 7, page 45. Of the homicide victims tested for alcohol and drugs (i.e. in the hospital for less than 24 hours), a large percentage had positive blood alcohol levels as well as having drugs present. The percent of homicide victims with positive blood tests for drugs varied with the method used with none of those dying of asphyxia and 2/3 of those dying from head trauma having drugs present.

### Abuse Drug Involvement (Table XXVI, page 46)

Cocaine was the abuse drug seen most frequently in homicide victims. It was found in 25 homicide cases or 23% (25/110) of all non-vehicular homicides. Cocaine was associated most strongly with deaths by gunshot wound, with 17 of the 25 cases with cocaine present (68%) being deaths due to gunshot wound. Heroin was the second most frequently found drug with 5 of 6 cases due to gunshot wound (83%) having heroin present. Stabbing was the homicide method which was associated with drugs next most frequently to gunshot wound. Cocaine was present in 6 cases and amphetamines were present in 6 cases who died by stabbing.

### Racial Distribution (Table XXVII, page 47)

Overall, deaths by homicide occurred most frequently in whites (43%) followed closely in frequency in blacks (37%). However, deaths by firearms occurred with a greater frequency in blacks (48%) than in either whites (27%) or Asians (15%). Vehicular deaths occurred more frequently in whites and less frequently in blacks than would be predicted based on the percentages of these racial groups involved in all types of homicides.

### Age Distribution (Tables XVIII and XXIX, page 48)

There were 16 homicides in the 0-19 year age group, a doubling of the number of homicides in this age group from the previous fiscal year. More than half (56%) of these homicides were due to firearms. Deaths by firearms occurred in the age groups of less than 59 years with a peak occurrence in the 20-29 year age group. The peak occurrence of stabbing deaths was in the 30-39 year age group.

### Distribution by Sex (Table XXX, page 49)

Males were nearly four times as likely to be homicide victims as females. This male predominance was even more pronounced for deaths by firearms where 94% of the homicide victims were male. However, females were twice as likely than males to die by strangulation. And, females were just as likely as males to die as a result of head trauma.

### NON-VEHICULAR HOMICIDES

Homicides are those deaths caused by another person, generally resulting in murder and manslaughter charges. In San Francisco, 110 non-vehicular homicides occurred in 1987-88, accounting for 6% of the total Medical Examiner investigations.

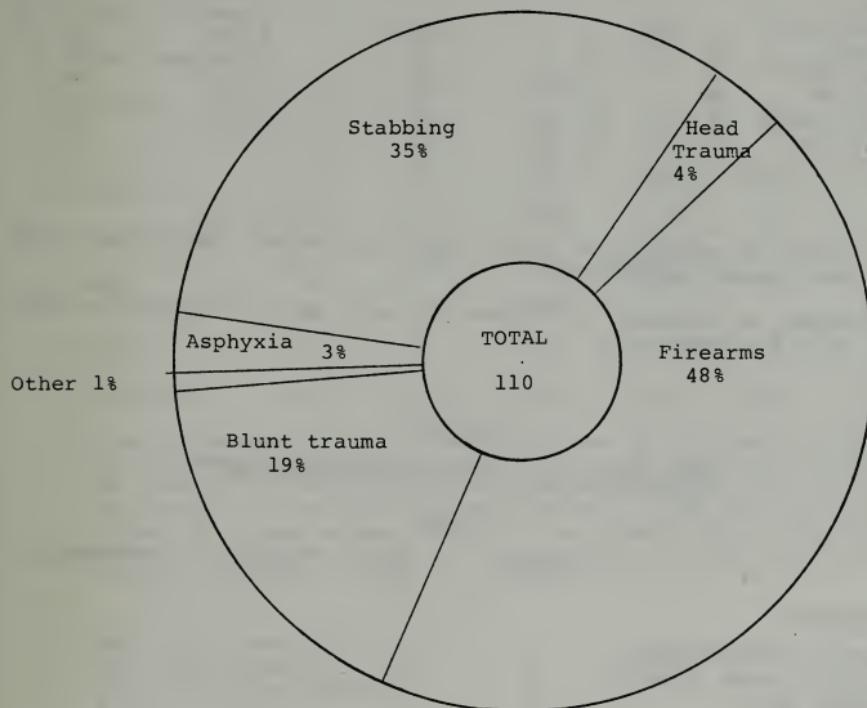


Figure 7.

## HOMICIDAL DEATHS BY MODE

Drug and Alcohol Involvement

<u>METHOD</u>	<u>NUMBER</u>	<u>% OF TOTAL HOMICIDES</u>	<u>% WITH ALCOHOL*</u>	<u>AVE. ALC. CONC.(g%)</u>	<u>% WITH DRUGS**</u>
ASPHYXIA/ STRANGULATION	3	2	33	0.05%	0
STABBING	35	29	60	0.17%	32
HEAD TRAUMA	4	3	25	0.07%	67
FIREARMS	48	39	35	0.14%	48
BLUNT TRAUMA	19	15	26	0.15%	6
VEHICULAR	13	11	23	0.19%	27
OTHER	1	1	0	-	0

\* Refers to percentage of victims (of those tested) with positive blood ethyl alcohol concentrations

\*\* Refers to percentage of victims (of those tested) with positive blood tests for abuse drugs.

TABLE XXVI.

DRUGS PRESENT IN NON-VEHICULAR HOMICIDAL DEATHS

<u>Situation</u>	<u>Drugs</u>			
	<u>Cocaine</u>	<u>PCP</u>	<u>Heroin</u>	<u>Amphetamines</u>
ASPHYXIA/STRANGULATION	0	0	0	0
MULTIPLE TRAUM. INJURIES	2	0	1	0
GUNSHOT WOUND	17	0	5	0
STABBING	6	0	0	6
OTHER	0	0	0	0
TOTALS	25	0	6	6

TABLE XVIII. HOMICIDE METHODS BY RACE

<u>Method</u>	<u>Race</u>					<u>Total</u>
	<u>W-NH**</u>	<u>W-H</u>	<u>B-NH</u>	<u>Asian</u>	<u>Other</u>	
Asphyxia/Strang.	0	2 (67%)	0	1 (33%)	0	3
Head Trauma	1 (25%)	1 (25%)	2 (50%)	0	0	4
Vehicular	7 (54%)	2 (15%)	2 (15%)	1 (8%)	1 (8%)	13
Firearms	8 (17%)	5 (10%)	23 (48%)	7 (15%)	5 (10%)	48
Stabbing	9 (26%)	5 (14%)	14 (40%)	4 (11%)	3 (9%)	35
Blunt Trauma	9 (47%)	3 (16%)	4 (21%)	3 (16%)	0	19
Other	0	0	1 (100%)	0	0	1
<b>TOTALS</b>	<b>34</b>	<b>18</b>	<b>46</b>	<b>16</b>	<b>9</b>	<b>123</b>
<b>% OF TOTAL</b>	<b>28%</b>	<b>15%</b>	<b>37%</b>	<b>13%</b>	<b>7%</b>	

\* Row percentages refer to percentages by race for each method. These can be compared to total percentages for each race to see whether a method is more or less prevalent in a racial group. For instance, death by asphyxia/ strangulation appears to occur more frequently in Asians (33%) than the general involvement of Asians in homicides (13%), while deaths due to blunt trauma appear to occur less frequently in black/non-Hispanics (21%) than all homicides in black/non-Hispanics (37%).

\*\*W-NH = White/Non-Hispanic

W-H = White/Hispanic

B-NH = Black/Non-Hispanic

TABLE XVIII. HOMICIDE METHODS BY AGEAge

	<u>0-12</u>	<u>13-16</u>	<u>17-19</u>	<u>20-29</u>	<u>30-39</u>	<u>40-49</u>	<u>50-59</u>	<u>60-69</u>	<u>70-79</u>	<u>80+</u>
<u>Method</u>										
Asphyxia/Strang.	0	0	0	0	1 (33%)	0	0	2 (67%)	0	0
Head Trauma	0	0	0	1 (25%)	1 (25%)	0	2 (50%)	0	0	0
Firearms	2 (4%)	2 (4%)	5 (10%)	18 (38%)	15 (31%)	4 (8%)	2 (4%)	0	0	0
Blunt Trauma	1 (5%)	0	0	3 (16%)	5 (26%)	3 (16%)	3 (16%)	2 (11%)	0	2 (11%)
Vehicular	3 (23%)	0	2 (15%)	1 (8%)	3 (23%)	0	2 (15%)	1 (8%)	1 (8%)	0
Stabbing	1 (3%)	0	0	5 (14%)	16 (46%)	5 (14%)	4 (11%)	3 (9%)	1 (3%)	0
TOTALS	7	2	7	28	41	12	13	8	3	2
% OF TOTALS	(6%)	(2%)	(6%)	(23%)	(33%)	(10%)	(11%)	(7%)	(2%)	(2%)

\* Row percents refer to percentage by age range for each method. These can be compared to total percentages for each age range to see if a method is more or less prevalent in an age group. For example, deaths by firearms appear to occur more frequently in the 20-29 years of age group (38%) than the general involvement of this age group in homicides (23%) while deaths by firearms in the 50-59 year age group (4%) occur less frequently than all homicides in this age group (11%).

TABLE XXIX. AGE RANGES - COMPARISON BY YEAR

<u>Age range</u>	<u>YEAR</u>						
	<u>'81-'82</u>	<u>'82-'83</u>	<u>'83-'84</u>	<u>'84-'85</u>	<u>'85-'86</u>	<u>'86-'87</u>	<u>'87-'88</u>
0 - 19	16	7	8	8	9	8	16
20 - 29	33	26	21	30	40	28	28
30 - 39	36	30	27	22	27	27	41
40 - 49	18	16	16	10	18	18	12
50 - 59	16	16	4	10	7	11	13
60 - 69	6	6	6	5	4	8	8
70 and above	7	2	3	10	15	10	5

TABLE XXX. HOMICIDE METHODS BY SEX

<u>Method</u>	<u>Sex</u>	
	<u>Male</u>	<u>Female</u>
Asphyxia/Strangulation	1 ( 33%)	2 ( 67%)
Head Trauma	2 ( 50%)	2 ( 50%)
Firearms	45 ( 94%)	3 ( 6%)
Mult. Traum. Inj.	10 ( 53%)	9 ( 47%)
Vehicular	10 ( 77%)	3 ( 23%)
Stabbing	29 ( 83%)	6 ( 17%)
Other	0 ( 0%)	1 (100%)
TOTALS	97	26
% OF TOTALS	(79%)	(21%)

\* Row percents refer to percentages by sex for each mode. These can be compared to total percentages for each sex to see whether a mode is more or less prevalent in one sex. For example, deaths by firearms appear to occur more frequently in males (94%) than the general involvement of males in homicides (79%), while deaths by firearms in females (6%) occur less frequently than all homicides in females (21%).

## PATHOLOGY

In the Pathology Department, tissue and body fluid samples taken at autopsy are prepared for microscopic study, histochemically stained, or analyzed for chemical constituents. Cardiac pacemakers or other mechanical life-support devices are examined for any defect. Smears or "wet-mounts" are examined for spermatozoa, bacteria, or tuberculosis. Bacteriologic cultures may be taken. However, if pathogens are grown, they are usually sent to the Department of Public Health (state or local) for further identification. If indicated, "soft" X-rays or histochemical tests are done to establish entrance or exit gunshot wounds. Here, also, research techniques such as methods of obtaining fingerprints from the skin of a victim, are developed.

MONTHLY FIGURES

1987-1988

## PATHOLOGY\*

YEAR	TOTAL CORONER'S CASES	CASES REFERRED TO PATHOLOGIST	NO. OF ORGANS SUBMITTED	NO. OF SECTIONS TAKEN	HISTO PATHOLOGIC SLIDES MADE	SPECIAL STAINS **	BLOOD GROUPINGS ***	OTHER DETERMINA- TIONS ****
<b>1987</b>								
JUL	137	99	660	1489	561	60	29	400
AUG	144	117	822	1736	742	73	18	300
SEP	135	98	681	1449	641	115	20	295
OCT	154	224	831	1975	745	98	18	310
NOV	148	110	791	3457	650	131	17	382
DEC	157	116	997	2419	898	145	22	462
<b>1987</b>								
JAN	136	114	795	3366	777	145	26	526
FEB	144	120	1096	2527	1037	73	20	405
MAR	131	105	629	2655	755	126	14	505
APR	168	130	1146	3766	843	154	25	275
MAY	163	136	801	3907	1453	102	34	374
JUN	144	104	844	1287	512	74	16	326
TOTALS	1761	1371	10092	30033	9615	1296	259	4560

\*

These figures do not reflect photography, forensic radiology, or material prepared for teaching forensic pathology

\*\*

Includes smears examined for bacteria and spermatazoa

\*\*\*

ABO and Anti-Rh

\*\*\*\*

Blood, urine, water, evidence for: hematatology, biochemistry, urinalysis, bacteriology, serology, "Sickledix," etc.

## TOXICOLOGY

Toxicology is the study of the interaction of foreign compounds, such as drugs, with living organisms (e.g. people). It involves knowing something of the nature of that interaction, how the foreign compounds break down (that is, how they are metabolised), and what effects they have on the health and behavior of the individual.

All of this information is vital to the role that toxicology plays in the determination of the cause of death, as well as in evaluating the significance of chemicals found in the living.

Generated within the Toxicology Department is information on samples from Coroner's cases as well as from suspects in criminal cases (e.g.. homicides, driving under the influence, probation failure,(H and S 11550), assaults) and other persons to be tested at the request of various law enforcement agencies. The data obtained in these cases enable the toxicologist to assist in interpreting the behavior of the suspects involved, to advise the District Attorney, the Public Defender, the City Attorney, Police Department, the California Highway Patrol, and other agencies, and to give expert testimony in court as necessary in such cases as to the effect of drugs in the case. This application of toxicological facts to legal problems is Forensic Toxicology.

The Toxicology Department also performs analyses on samples submitted by the Police and Fire Departments in connection with the recruitment programs and other personnel requirements. The results in some cases are presented to the respective commission in official hearings.

Toxicological facts are determined through tests performed on biological samples (e.g. Blood, urine, gastric contents, liver, etc) taken at the time of autopsy or from living persons. The samples are subjected to a series of chemical manipulations designed to extract any drugs or other physiologically active compounds that may be present. The subsequent extracts are then examined by equipment set up to detect, accurately identify, and quantitate any materials that may be present. These determinations must be of unquestionable accuracy and as specific as scientifically possible; and they must be able to stand up to review by any other qualified laboratory in the nation.

The analytical methods most commonly used in the toxicological studies are gas and thin layer chromatography; ultraviolet, visible, and fluorescence spectrophotometry, and immunoassay techniques. Advanced techniques, such as mass spectrometry and HPLC (High Performance Liquid Chromatography) are used as necessary for confirmation of difficult samples. These precise and sophisticated methods require the use of advanced laboratory apparatus and highly trained personnel.

## Toxicology, Continued

As a routine part of the work, the levels of drugs in two or more body compartments (one of which is invariably blood) are determined in order to answer the question of acute or chronic drug use. This approach is of the utmost importance in determining the time of ingestion and whether the intent of the ingestion was accidental or suicidal.

The range of drugs available to the public is extremely wide, and the nature and type of compounds involved are highly variable. The methodologies necessary to conduct toxicological analyses have to be similarly wide ranging and also continually expanded in order to keep up with the manufacture of new compounds, both legal and illegal. This is an important aspect of the Toxicology Department's work, often requiring extensive research. So, too, does the identification of "street-manufactured" compounds which are sometimes found in post-mortem samples. Also, with many drugs being compounded to have physiologic effect at very low doses, detection in body fluids is often extremely difficult.

The most common drugs in the community are alcohol and prescription items. However, illegal, or "street", drugs (especially morphine-type alkaloids [e.g. heroin], cocaine, and amphetamines) represent a very significant percentage of the compounds actually found in the cases presented to the Toxicology Department. Less commonly used drugs, industrial materials, certain gases, and various other foreign compounds have also been detected.

In reviewing the data presented in the ensuing pages, it will be seen that the number of tests per case performed on all cases received by the Toxicology Department for the year July 1986-June 1987 was 5.37. For the year July 1987-June 1988 it was 6.44. This represents an increase of 19.9% in the work-load per case in this item alone. The work increase in other sections is reflected in the data. For instance, there was an increase of 71.0% in the number of cases referred to the Toxicology Department, which resulted in the remarkable increase of 104.9% in the number of toxicological tests performed. These astonishing increases in work-load reflect the increasing concerns of the community with respect to drug use, and they have contributed to the fact that forensic toxicology continues to be one of the fastest growing sections in the Medical Examiner's Office.

TOXICOLOGY  
MEDICAL EXAMINER - CORONER'S CASES

SAN FRANCISCO CITY AND COUNTY  
July 1987 - June 1988

Incidence of drugs and other physiologically active material detected

The compounds listed are not necessarily the cause of death nor even a contributing factor. They are the toxic agents that were found to be present, either singly or in combination, in Medical Examiner-Coroner's cases.

ABUSE DRUGS

Morphine-type alkaloids	106
Cocaine	115
Benzoylecgonine	116*
Codeine	55
Methamphetamine	40
Ampphetamine	38
Phencyclidine (PCP)	10
9-THC	4

ANTI-DEPRESSANTS

Amitriptyline (Elavil)	11
Nortriptyline (Aventyl)	4
Imipramine (Tofranil)	5
Desipramine (Norpramin)	12
Doxepin (Sinequan)	7
10-hydroxynortriptyline	1

\*Benzoylecgonine is not a drug of abuse. It is a metabolite of cocaine and is always present when cocaine is detected. In some cases, benzoylecgonine, nor cocaine, was found which indicated that there had been some exposure to cocaine.

ANALGESICS - NARCOTIC

Methadone	15
Methadone Metabolite	6
Propoxyphene (Darvon)	3
Norpropoxyphene	3
Meperidine	1
Hydrocodone	1
Pentazocine (Talwin)	2

SEDATIVE-HYPNOTICS  
Barbiturates

Phenobarbital	11
Secobarbital	5
Pentobarbital	2
Butalbital	1

ANALGESICS - NON-NARCOTIC

Salicylates	25
Acetaminophen	11

ANTI-ANXIETY AGENTS

Diazepam (Valium)	20
Nordiazepam	16
Triazolam (Halcion)	5
Chlordiazepoxide (Librium)	5
Alprazolam (Xanax)	3
Lorazepam (Ativan)	3
Flurazepam (Dalmane)	1
N-Desalkylflurazepam	6

CARDIAC DRUGS

Lidocaine	97
Diltiazem (Cardizem)	1
Propranolol (Inderal)	1

SEDATIVE-HYPNOTICS  
Non-Barbiturates

Chloral hydrate metabolite (Trichloroethanol)	2
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Drugs Detected, Continued

ANTIHISTAMINES

Diphenhydramine	6
Chlorpheniramine	1

ANTICONVULSANTS

Diphenylhydantoin (Dilantin)	20
Valproic Acid (Depakene)	2
Carbamazepine (Tegretol)	4

ANTITUSSIVES

Dextromethorphan	3
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ANTI-INFLAMMATORY

Indomethacin	1
--------------	---

ANOREXIC AGENTS

Phentermine	2
-------------	---

PESTICIDES

Isotox	1
--------	---

BRONCHODILATORS

Theophylline	5
Ephedrine	14
Metaproterenol metabolite	1

TRANQUILLIZERS

Chlorpromazine (Thorazine)	1
Prochlorperazine	1
Thioridazine (Mellaril)	1

MISCELLANEOUS

Carbon Monoxide	11
Cyanide	2
Acetone	7
Chloroform	1
Methyl alcohol	1
Phenylacetone	1

ANTI-GOUT AGENTS

Allopurinol (Zyloprim)	1
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TOXICOLOGY

MEDICAL EXAMINER - CORONER'S CASES

SAN FRANCISCO COUNTY  
July 1987 - June 1988

<u>Year/ Month</u>	<u>No. of Cases Referred to Toxicology</u>	<u>No. of Specimens Received</u>	<u>No. of Tests Performed</u>	<u>Alcohol Tested</u>	<u>Pos.</u>	<u>% Pos.</u>
<u>1987</u>						
JUL	135	915	810	104	25	24.0
AUG	142	972	866	128	25	19.5
SEP	138	961	919	119	30	25.2
OCT	148	1058	1041	130	31	23.8
NOV	156	1036	899	141	26	18.4
DEC	160	1237	1228	148	30	20.3
<u>1988</u>						
JAN	124	921	1073	122	33	27.0
FEB	142	1058	1138	129	33	25.6
MAR	141	1065	929	134	36	26.9
APR	170	1170	1136	151	34	22.5
MAY	159	1153	1145	147	41	27.9
JUN	145	1069	1064	116	32	27.6
<b>TOTAL</b>	<b>1760</b>	<b>12615</b>	<b>12248</b>	<b>1569</b>	<b>376</b>	<b>24.0</b>

## TOXICOLOGY

### MEDICAL EXAMINER - CORONER'S CASES FROM OUTSIDE SAN FRANCISCO COUNTY July 1987 - June 1988

<u>Year/ Month</u>	<u>No. of Cases</u>	<u>No. of Specimens Received</u>	<u>No. of Tests Performed</u>	<u>Alcohol Tested</u>	<u>Pos.</u>	<u>% Pos.</u>
<b><u>1987</u></b>						
JUL	1	8	20	1	0	0.0
AUG	-	-	-	-	-	-
SEP	-	-	-	-	-	-
OCT	4	24	42	3	1	33.3
NOV	-	-	-	-	-	-
DEC	2	10	15	2	1	50.0
<b><u>1988</u></b>						
JAN	1	8	13	1	0	0.0
FEB	2	6	10	1	1	100.0
MAR	1	7	9	1	0	0.0
APR	1	6	11	1	0	0.0
MAY	1	6	11	1	1	100.0
JUN	1	8	14	1	1	100.0
<hr/>						
TOTAL	14	83	145	12	5	41.7

TOXICOLOGY

FORENSIC TOXICOLOGY CASES

JULY 1987 - JUNE 1988

Cases in which specimens were referred to the Medical Examiner-Coroner's Toxicology Laboratory for forensic toxicological examination generally were criminal cases in which the presence of drugs was suspected either in the victim or suspect of the crime. Testing of 11550, probation, DUI, management control and other miscellaneous cases is included in this tabulation.

<u>YEAR/MONTH</u>	<u>No. Cases Referred to Toxicology</u>	<u>No. of Specimens Received</u>	<u>No. Of Tests Performed</u>
<u>1987</u>			
JUL	37	67	211
AUG	53	105	274
SEP	47	93	247
OCT	48	91	291
NOV	68	132	401
DEC	67	127	321
<u>1988</u>			
JAN	56	118	324
FEB	73	144	358
MAR	78	143	484
APR	233	298	1330
MAY	357	461	2066
JUN	410	511	2559
<hr/>			
TOTAL	1527	2290	8866

TOXICOLOGY

FORENSIC TOXICOLOGY CASES

JULY 1987 - JUNE 1988

Incidence of drugs detected in all cases submitted to the Medical Examiner - Coroner's Office Toxicology Laboratory for forensic toxicological examination.

The samples in which these compounds were found to be present, either singly or in combination, were generally obtained from either suspects or victims in criminal cases, probationers or via management control investigations.

TYPE OF CASE

<u>Drug</u>	<u>Out-of-County</u>	<u>DUI</u>	<u>Probation</u>	<u>Other*</u>
Ethyl alcohol	0	181	0	27
Cocaine	0	55	291	173
Benzoyllecgonine	0	57	348	188
Phencyclidine (PCP)	0	51	2	124
Tetrahydrocannabinol	0	14	139	3
Morphine-type alkaloids	2	9	61	144
Methamphetamine	2	10	8	50
Amphetamine	1	7	8	48
Methadone	1	0	0	1
Ephedrine	1	4	0	2
Naloxone	1	0	0	0
Nordiazepam	1	2	0	1
Lidocaine	1	2	0	1
Carbamazepine	1	0	0	0
Diphenylhydantoin	1	0	0	0
Methaqualone	0	15	0	0
Codeine	0	9	9	44
Diazepam	0	2	0	0
Diphenhydramine	0	1	0	1
Lorazepam	0	1	0	3
Phenobarbital	0	1	0	0
Phenylpropanolamine	0	1	0	0
Caffeine	0	0	0	2
Propoxyphene	0	0	0	2
Norpropoxyphene	0	0	0	2
Flurazepam	0	0	0	1
Methyl alcohol	0	0	0	1
Triazolam	0	0	0	1
Amitriptyline	0	0	0	1
Nortriptyline	0	0	0	1
Hydroxyamitriptyline	0	0	0	1
Hydroxynortriptyline	0	0	0	1

\* Other includes testing for 11550, homicide suspects, management controls and other miscellaneous cases.

## ABUSE DRUGS

The role of abuse drugs in deaths during the 1987-88 fiscal year is presented in this section. The four abuse drugs most commonly seen in Medical Examiner-Coroner's cases - cocaine, heroin, amphetamines and PCP - will be examined. The number of cases in which these drugs were found either alone or in combination with other abuse drugs are presented in Table XXXI, page 62. Cocaine was the most frequently observed drug of abuse where drugs were present alone while heroin was the most frequently observed when drugs were present in combination.

### Distribution by Sex (Table XXXII, page 63)

In deaths caused by abuse drugs (DC) or deaths related to abuse drugs (DR), where the drugs were present either singly or in combination, 67-100% of the deceased individuals were males.

### Distribution by Race (Table XXXII, page 63)

White/Non-Hispanic (W-NH) - In drug-caused deaths where abuse drugs were present either singly or in combination with other abuse drugs, the white non-Hispanic racial group predominated in deaths caused by heroin and amphetamines.

Black/Non-Hispanic (B-NH) - In drug-caused and drug-related deaths where abuse drugs were present singly, the black non-Hispanic racial group predominated in deaths where cocaine was present. This racial group was only minimally represented in drug-caused deaths where heroin alone was present (15%).

White/Hispanic (W-H) - This racial group was most heavily represented in deaths where PCP was present, either alone or in combination with other drugs.

### Distribution by Age (Table XXXII, page 63)

In deaths where abuse drugs were present singly, there were some notable differences in mean ages of the victims. Users of PCP (drug-related deaths only) were of a considerably younger mean age (24.3 years) as compared to the mean ages of users of cocaine (drug-caused, 30.7 years), heroin (38.7 years) and amphetamines (42.3 years). In deaths where abuse drugs were present in combination, the mean ages of users of cocaine, heroin and amphetamines were more homogeneous than in deaths where drugs were present singly, but the mean age of victims with PCP present was still considerably lower (24.3 years).

### Alcohol Involvement (Table XXXII, page 63)

The presence of alcohol in the blood of abuse drugs users was most often associated with deaths caused by heroin alone (67%) and was least associated with deaths due to amphetamines alone.

#### Deaths Involving Cocaine (Tables XXXIII and XXXIV, pages 64 and 65)

Cocaine alone was the cause of death in 28 cases by overdose. Cocaine alone was also present in 41 non-drug caused deaths (See Table XXXIII) including 10 ruled to be accident, 6 ruled to be suicide and 23 ruled to be homicide. Notably, 22 of these 41 deaths were by gunshot wound or stabbing.

Cocaine in combination with other drugs was the cause of death in 19 cases by overdose. Cocaine in combination was also present in 13 non-drug caused deaths (See Table XXXIV) including 5 cases ruled to be homicides. Of these 13 deaths, 5 were by gunshot wound or stabbing.

#### Deaths Involving Heroin (Table XXXV, page 66)

Heroin alone was the cause of death in 20 cases by overdose and was present in 6 non-drug caused deaths, including 2 ruled to be homicides. The involvement of heroin alone in non-drug caused deaths, particularly homicides, was much less extensive than the involvement of cocaine, both in number and method of death. There were no deaths by stabbing in which heroin was present either alone or in combination with other drugs.

Heroin in combination with other drugs was the cause of death in 40 cases by overdose. Heroin in combination was present in 7 non-drug caused deaths, significantly lower than the number seen with cocaine in combination.

#### Deaths Involving Amphetamines (Table XXXVI, page 67)

Amphetamines alone were the cause of death in 7 cases by overdose and were present in 12 non-drug caused deaths, including 5 homicides and 1 suicide, all by stabbing. It is notable that there were no homicide deaths by gunshot wound in which amphetamines alone were present.

Amphetamines in combination with other drugs were the cause of death in 15 cases by overdose. Amphetamines in combination with other drugs were also present in 3 non-drug caused deaths, one of which was a suicide by stabbing.

TABLE XXXI. ABUSE DRUGS  
SAN FRANCISCO MEDICAL EXAMINER-CORONER'S CASES

Abuse Drugs Present Alone

<u>Drug</u>	<u>Drug Caused Deaths</u>	<u>Drug Related Deaths</u>	<u>Role Unclear</u>	<u>Incidental Finding</u>
Cocaine alone	28	41	7	5
Heroin alone	20	6	3	10
Amphetamines alone	7	12	0	0
PCP alone	0	3	0	0

Abuse Drugs Present in Combination with Other Drugs

<u>Drug</u>	<u>Drug Caused Deaths</u>	<u>Drug Related Deaths</u>	<u>Role Unclear</u>	<u>Incidental Finding</u>
Cocaine in combination	19	13	1	1
Heroin in combination	40	7	2	7
Amphetamines in combin.	15	3	2	0
PCP in combination	3	3	0	0

TABLE XXXII. ABUSE DRUGS  
INCIDENCE BY SEX, RACE, AGE, AND ALCOHOL INVOLVEMENT

Drugs Present Singly

Drug	SEX		RACE			Mean Age	% WITH ALCOHOL	AVE. ALC. CONC (g%)
	%M	%F	%W-NH	%W-H	%B-NH			
COCAINE-DC*	75	21	21.4	17.9	42.9	30.7	40	0.12
COCAINE-DR**	83	17	24.4	7.3	58.5	30.1	41.5	0.17
HEROIN-DC*	80	20	65.0	10.0	15.0	38.7	67	0.12
HEROIN-DR**	100	0	50.0	33.3	0.0	42.5	16.7	0.25
AMPHET.-DC*	86	14	57.1	0.0	42.9	42.3	16.7	0.25
AMPHET.-DR**	83	17	83.3	0.0	8.3	36.3	58.3	0.10
PCP-DC*	-----		NONE					
PCP-DR**	100	0	0.0	33.3	0.0	24.3	33.3	0.07

Drugs Present in Combination

Drug	SEX		RACE			Mean Age	% WITH ALCOHOL	AVE. ALC. CONC (g%)
	%M	%F	%W-NH	%W-H	%B-NH			
COCAINE+-DC*	84	16	42.1	21.0	31.6	38.2	36.8	0.14
COCAINE+-DR**	92	8	30.8	23.1	38.5	35.3	38.5	0.15
HEROIN+-DC*	82	18	65.0	12.5	12.5	38.8	30.0	0.19
HEROIN+-DR**	86	14	14.3	14.3	57.1	36.0	42.9	0.10
AMPHET+-DC*	93	7	73.3	13.3	6.7	39.4	33.3	0.20
AMPHET+-DR**	100	0	66.7	0.0	33.3	38.3	33.3	0.21
PCP+-DC*	67	33	33.3	33.3	33.3	24.3	0.0	-
PCP+-DR**	100	0	0.0	100.0	0.0	23.3	66.7	0.19

\* DC = Drug Caused

\*\* DR = Drug Related

DEATHS INVOLVING COCAINE

TABLE XXXIII. COCAINE PRESENT ALONE

CAUSE OF DEATH	<u>Manner of Death</u>					<u>TOTALS</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UNK</u>	
<u>Drug Caused Deaths</u>						
OVERDOSE	24	1	0	1	2	28
<u>Drug Related Deaths</u>						
GUNSHOT WOUND	0	2	14	1	0	17
STABBING	0	0	5	0	0	5
VEH-AUTO DRIVER	4	0	0	0	0	4
VEH-MOTORCYCLE DRIVER	2	0	0	0	0	2
VEH-PEDESTRIAN	0	0	1	0	0	1
VEH-UNKNOWN	1	0	1	0	0	2
DROWNING	0	0	0	0	1	1
FALL	1	0	0	0	0	1
HANGING	1	0	0	1	0	2
HEPATITIS	1	0	0	0	0	1
TRAUMATIC INJ.	0	0	2	0	0	2
JUMP	0	3	0	0	0	3
TOTALS	34	6	23	3	3	69

DEATHS INVOLVING COCAINE

TABLE XXXIV. COCAINE IN COMBINATION WITH OTHER DRUGS

<u>CAUSE OF DEATH</u>	<u>Manner of Death</u>					<u>TOTALS</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UNK</u>	
<u>Drug Caused Deaths</u>						
OVERDOSE	19	0	0	0	0	19
<u>Drug Related Deaths</u>						
GUNSHOT WOUND	0	1	3	0	0	4
BURNS	0	0	0	1	0	1
SEPSIS	1	0	0	0	0	1
VEH-PEDESTRIAN	0	0	1	0	0	1
HANGING	0	1	0	0	0	1
FALL	1	0	0	0	0	1
ALCOHOLISM	1	0	0	0	0	1
JUMP-GG BRIDGE	0	1	0	0	0	1
STABBING	0	0	1	0	0	1
DROWNING	1	0	0	0	0	1
TOTALS	23	3	5	1	0	32

TABLE XXXV. DEATHS INVOLVING HEROINHeroin present alone

<u>CAUSE OF DEATH</u>	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>TOTALS</u>
<u>Drug Caused Deaths</u>				
OVERDOSE	18	2	0	20
<u>Drug Related Deaths</u>				
GUNSHOT WOUND	0	2	1	3
BLUNT TRAUMA	0	0	1	1
ASPHYXIA	0	1	0	1
FALL	1	0	0	1
TOTALS	19	5	2	26

Heroin present in combination with other drugs

<u>CAUSE OF DEATH</u>	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQUIV</u>	<u>TOTALS</u>
<u>Drug Caused Deaths</u>					
OVERDOSE	34	2	0	4	40
<u>Drug Related Deaths</u>					
GUNSHOT WOUND	0	0	3	0	3
BURNS	0	0	0	1	1
DRUG ABUSE RELATED	1	0	0	0	1
VEH-PEDESTRIAN	0	0	1	0	1
BLUNT TRAUMA	1	0	0	0	1
TOTALS	36	2	4	5	47

TABLE XXXVI. DEATHS INVOLVING AMPHETAMINESAmphetamines present alone

<u>CAUSE OF DEATH</u>	<u>Manner of Death</u>					<u>TOTAL</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UNK</u>	
<u>Drug Caused Deaths</u>						
OVERDOSE	5	0	0	2	0	7
<u>Drug Related Deaths</u>						
GUNSHOT WOUND	0	1	0	0	1	2
STABBING	0	1	5	0	0	6
VEH-AUTO DRIVER	1	0	0	0	0	1
DROWNING	1	0	0	0	0	1
HANGING	0	2	0	0	0	2
TOTALS	7	4	5	2	1	19

Amphetamines present in combination with other drugs

<u>CAUSE OF DEATH</u>	<u>Manner of Death</u>			<u>TOTAL</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	
<u>Drug Caused Deaths</u>				
OVERDOSE	15	0	0	15
<u>Drug Related Deaths</u>				
GUNSHOT WOUND	0	0	1	1
STABBING	0	1	0	1
DROWNING	1	0	0	1
TOTALS	16	1	1	18

## GLOSSARY

ALKALOID OF MORPHINE GROUP	Typically referred to as morphine-type alkaloid, this is the chemical substance found in body fluids after the injection of heroin or other drugs derived from opium
TOXICOLOGY NOT VALID OR ELIMINATED	This term indicates that the deceased lived long enough after the injury to have eliminated some or all toxic agents from the body
FORENSIC PATHOLOGY	The specialty field of medicine involving the application of medical and pathology principles in determining the cause and manner of sudden, unexpected, and medically unattended deaths. This includes the type and nature of injury, public health hazards, type or nature of homicide weapon, the relation of injury to death and interpreting other factors for the court. These data are prepared and presented to the judicial system or public health interests in keeping with the best available knowledge
MODE OF DEATH	Indicates the manner of death, such as natural, accident, suicide or homicide, and is to be distinguished from cause of death, which is purely a medical determination
MODE EQUIVOCAL	With the cause of death determined, investigative data do not clearly differentiate between two modes of death, although some evidence supports one more likely
MODE UNDETERMINED	With the cause of death determined, investigative data do not clearly support one of two possible modes and either one is possible without prejudice
MODE UNKNOWN	Circumstances insufficient to indicate between possible modes, as when only bones are found, or when no medical cause of death is determined
PATHOLOGY	That branch of medicine which deals with the essential nature of disease, especially in the structural or functional changes in tissues, organs or systems of the body causing disease. It involves the diagnosis of disease by microscopic or chemical analysis
SEROLOGY	That branch of pathology which deals with the analysis of blood and body fluids. Blood types for identification, exclusion of a suspect or judicial purposes are examples of the use in this office

TOXICOLOGY

The scientific study of poisons, their detection, actions and treatment. The relationship of drug levels to emotional or personality change, behavioral or reasoning ability are frequent decisions based on these data

MEDICAL EXAMINER

A physician specifically trained in forensic pathology who is responsible for investigating and determining the cause and manner of sudden or unexpected death

AUTOPSY

A scientific dissection of the human body to determine the cause and nature of death in order to detect public health hazards, determine the method or type of death in homicides and improve the level of medical care in the community. In some cases, showing that no injury or wrongdoing was present is of great emotional and stabilizing value to the family









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BOYD G. STEPHENS, M.D.  
CHIEF MEDICAL EXAMINER

850 BRYANT STREET  
SAN FRANCISCO, CA 94103



CHIEF MEDICAL EXAMINER - CORONER  
SAN FRANCISCO, CALIFORNIA

ANNUAL REPORT

JULY 1, 1988 - JUNE 30, 1989



BOYD G. STEPHENS, M.D.  
CHIEF MEDICAL EXAMINER

JOSEPH E. SURDYKA  
ADMINISTRATIVE CORONER

DONNA J. ALLISON, Ph.D.  
STATISTICIAN AND COMPILATOR

850 BRYANT STREET  
SAN FRANCISCO, CA 94103





March 1990

Honorable Art Agnos, Mayor  
Honorable Board of Supervisors  
City and County of San Francisco  
City Hall  
San Francisco, California 94102

Dear Mayor Agnos and Honorable Supervisors:

One of the significant differences between a Medical Examiner and a Coroner's system in the United States is the direct application of medicine to the living or dead in medico-legal cases and the nature of the services to the community welfare. This is called the practice of Forensic Medicine. To reflect this practice, we have added information about some of those functions to this report in order to more accurately document the services we perform.

During the 1988-89 fiscal year, there were many management and community problems that required attention. Drug caused and drug-related deaths, particularly those involving heroin, increased dramatically as did problems with environmental and work place hazards. Court requirements related to quantity of testing and to personnel time have both continued to increase. These problems, coupled with the changing financial base for the County, placed increasing management problems directly on this department.

As the service requirements changed, we have tried to alter the report format to reflect and document this responsibility. Currently, we do not have a method of relating the perceived increasing amount of personnel time required for the increased depth and quantity of work needed to meet these demands. Additionally, the immense amount of volunteer time is not included.

Almost all of the objectives set for the department have been met or exceeded. The computerization of the department is taking more time than expected, but is progressing, and the report on the County justification for an electron microscope has been submitted to the Mayor's office for review and action.

I believe the office has performed well over the past year and continues to improve as staffing and support increase to meet the ever-increasing demands of the community.

Sincerely,

Boyd G. Stephens, M.D.  
Chief Medical Examiner



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## INTRODUCTION

The Medical Examiner-Coroner is appointed by law to many responsibilities, the foremost of which is the investigation and certification of a variety of deaths including all deaths of other than natural causation, and any apparently natural deaths in which no physician can reasonably state the cause. The Medical Examiner can utilize any and all medico-legal investigative techniques, including autopsy, to establish both the medical cause of death, and mode or circumstances of death (natural, accident, homicide, suicide or undetermined).

The deaths which must be reported to the Medical Examiner-Coroner, as required by various sections of the Government, Health and Safety and Penal codes, are as follows:

1. Homicide - known or suspected
2. Suicide - known or suspected
3. Following accident or injury (whether the accident or injury is the primary cause or contributory, with death occurring immediately or at some remote time)
4. Medical attendance of less than 20 days
5. No physician in attendance
6. Physician unable to state the cause of death (must be unable, not merely unwilling)
7. Poisoning (food, chemical, drug, therapeutic agents)
8. Occupational or industrial deaths
9. All deaths where a patient has not fully recovered from an anesthetic, whether in surgery, recovery room, or elsewhere
10. All deaths in operating rooms
11. All solitary deaths (unattended by physicians or other person in the period immediately preceding death)
12. All deaths in which the patient is comatose throughout the period of the physician's attendance
13. All deaths of unidentified persons
14. All deaths where there are grounds to suspect that the death occurred in any degree from a criminal act
15. All deaths involving contagious disease - known or suspected - and constituting a public health hazard
16. Deaths in prison or while under sentence
17. All deaths associated with a rape - known or alleged - or crime against nature
18. All deaths related to or following abortion - known or suspected
19. All deaths involving drowning, fire, hanging, gunshot, stabbing, cutting, starvation, exposure, alcoholism, drug addiction, strangulation or aspiration

Additional mandated responsibilities include protection and safekeeping of property belonging to deceased individuals, conducting inquests when indicated, maintaining proper public records, making reports to other agencies, identification of deceased persons, interment of indigent dead, and many other death-related activities.

The work with the living is discussed elsewhere.



## FORENSIC MEDICINE

Forensic medicine generally is considered to be a marriage of medicine and the forensic sciences oriented to medico-legal issues. The field is wide-ranging and growing, becoming even broader in scope than the traditional concept practiced in Europe.

There has been continued growth and accentuation of the role of forensic medicine in the legal and medico-legal world over the past year. Major cases like the Lake and Eng killings in Calavaras County, the issue of Satanic and cult killings, the "Night Stalker", and missing children, have consumed enormous time and effort. Our voluntary staff has contributed hundreds of hours on these problems, making possible the "investigation team" necessary for these types of cases. This office has continued its role in forensic medicine for both living and dead, playing a vital role in the community.

Generally, we receive little publicity for this work. Yet, in addition to our traditional work, we serve in a number of places in the community. Some of these include:

### Examination and diagnosis of the living:

- Examination and evaluation of child abuse
- Examination and evaluation of sexual assault
- Examination and evaluation of spousal abuse
- Evaluation of citizens' complaints against the police department
- Testimony and interpretation of hospital records and procedures
- Evaluation of force and patterned injuries
- Examination of victims and suspects for trace evidence and injuries
- Collection of blood from suspects and victims for serology, toxicology and other testing
- Court testimony on force, great body injury (GBI) and other issues
- Alcohol and drug interaction in driving under the influence cases and related issues
- Physiologic effects of drug interactions
- Toxicology, including environmental and industrial toxicity
- Teaching - hospital, forensic, law enforcement, community

### Examination and evaluation of the dead:

- Scene investigation, reconstruction and analysis
- Evidence collection and testing
- Blood spatter analysis and interpretation
- Patterned evidence analysis and interpretation
- Trace evidence collection
- Time and place of death information
- Forensic autopsy consultation and interpretation
- Analysis for chemical and limited serology testing
- Forensic toxicology
- Consultation with District Attorney and Public Defender
- Analysis and court presentation
- Teaching - forensic and legal medicine

Due to significant shortages in professional staff, we have had to reduce the amount of work that we can do in some of the above areas, but every effort is being made to bring the medical staff up to the approved number and to return to full service activity.

The department faces some significant problems now and for the future. One of these is the increasing numbers of "designer drugs" which are made for a number of reasons, including avoidance of existing Federal laws. These chemical analogues or new molecules constantly require new analytic approaches, techniques and standards. Hazards to users, officers and laboratory personnel are largely unknown, and some of the compounds are so dangerous that skin contact can be lethal or can produce delayed complications, such as Parkinson's degeneration of the brain.

The need for ever-increasing scientific capabilities in instrumentation and techniques results in a requirement for increased training and equipment for the department. There is a need for increased interfacing with other agencies and departments along with a need for information sources and sharing. These are some of the major problems for the future. The information and records issue will necessitate a major decision and policy-making step over the next five years. Although initial costs to the County will be relatively high, the long-term benefits and cost savings will more than offset this investment of time and money. Obtaining access to major library data bases, legal information, and records management constitute some of the most expensive and time-consuming aspects of departmental management for this next five year period. The forensic world is growing so rapidly that it is difficult to foresee its exact direction. Trace evidence and DNA serology are unquestionably going to be a large part of that future for the next five years, and this department will be in the midst of these advances.

#### MAJOR DEPARTMENTAL ISSUES

There is a continuing problem with the issue of tissue and organ harvesting. The need to improve and prolong life is more and more being forced into direct conflict with the needs of the legal system to insure that the constitutional rights of victim and accused are protected. As medical capabilities to transplant continue to increase, demands on acute trauma deaths as an ideal tissue source increase. Since some or many of these cases are under the jurisdiction of the Medical Examiner, there is an increasing unresolved conflict. There is a recent acceleration of these problems, due in part to new laws that do not consider the effects on the court system. More and more frequently, victims are removed from a scene, resuscitated, and, although unsalvageable, are placed on life support for hours or days in the event that they may be a source for tissues or organs. During this time, trace evidence is lost, toxic or legally important drugs and chemicals are being metabolized, clothing is lost and injuries are healing or disappearing. Generally, the responsible transplant centers are becoming more aware of this problem. They have become more interested in supporting laws and local policies that insure the documentation and collection of important evidence so that there will be no reduction in their harvest source. Locally, this is being done by mutual agreement, but it needs to be based on State laws and education for the medical community so that there

is general awareness of the significance of and the nature of evidence that must be collected.

There has been a significant increase in the numbers of contagious cases that require autopsy. Although AIDS cases are generally considered to be natural deaths, and the death certificate can be signed by the treating physician, unnatural deaths or sudden and unexpected deaths in individuals with AIDS can only be handled by this office. The numbers of such cases have increased significantly, so that they are almost a daily occurrence. Besides the potential risk to the staff, the costs of performing autopsies on these cases is at least three times higher per case because of the protective equipment required, the extensive staff time both for performance of the procedure as well as decontamination afterwards. There is also an increased risk and handling cost in the laboratories and in subsequent specimen destruction.

Finally, there is a major departmental problem in compliance with both the spirit and law in hazardous materials regulation. As an office staffed almost entirely by employees with advanced degrees, mostly in the medical and laboratory sciences, many of these regulations and requirements are simplistic and unrealistic. The thrust of the law requires a considerable amount of staff time which we currently don't have and haven't been able to meet. Training requirements, regulations and documentation requirements and much of the documentation are just not physically possible with the existing staff. We also need informed clarification of portions of these sweeping changes. To make all solvents, glues, adhesives, etc. designated as hazardous materials is not scientifically valid or reasonable. By law, each piece of Scotch tape, or empty bottle of "White Out" requires the full compliment of hazardous material protection. The wording and interpretation of these laws must be changed to be realistic and the department must be brought into compliance with both the employee protection aspects of the law and the environmental perspectives.

#### STATEMENT OF CURRENT MANAGEMENT AND SCIENTIFIC POSITION

Largely due to the immediate past Coroner, Dr. Henry Turkel, the physical facilities of the San Francisco Medical Examiner's office are well designed and are suitable for the forensic medicine usually practiced in this County. He provided for room to expand, and this expansion has been completed. This facility should be adequate for the County needs well into the 1990's.

Our increasing work load had fallen specifically on two areas of the office, but has affected all divisions. The Toxicology Department has experienced both a significant work load increase as well as an expansion in purpose. A large portion of the Toxicology laboratory work now includes forensic toxicology testing of specimens from living persons. This includes employment screening, and testing in environmental exposures, probation violations, law enforcement exposures, citizen complaints against police and DUI cases involving unusual circumstances or questions. Over the past few years, the County has been replacing the outmoded equipment in this department, thereby improving its capabilities of meeting the growing demands and requirements. We still need to improve the instrumentation and staffing in this department and need to reorganize the departmental structure to reflect the increasing work and demands on the professional staff.

The second area in which this pressure is being felt is in administration. The work load is greater than staffing can handle. Many times, only one person is in the office to handle all telephone calls, process all the paper work and interface with the public.

## I. ADMINISTRATIVE

Although staffing in this section is at the authorized level, it is marginal or inadequate for the work load. We are in the process of changing to a computerized system for handling not only our extensive word processing work load, but our office records as well. This process would include entering the initial Deputy's investigation on the computer, as well as all subsequent data so that, eventually, all records pertaining to a given case would be on the computer. This includes the laboratory reports. There are many advantages to this system and some significant dangers. The benefits include rapid access and retrieval by this department of any record on the system, immediate update and addition to the records by each authorized section, immediate access for read-only capability by other authorized departments, such as homicide, Public Defender and the District Attorney, markedly improved ability to access data for demographic and statistical information, and trend analysis of medical and social problems. It would then be unnecessary to bind and maintain our records, currently a costly and difficult task, and would eliminate the major storage problems for the large volume of material. By adding evidence and property data management, chain of possession and property management can be improved. Our word processing experience has shown that, although it is a lot of work to set up, these repetitive steps can be managed with significant savings in time and personnel costs. Reflecting this new direction, a major goal is to reorganize this section of the department.

## II. INVESTIGATIVE

The investigative staff is up to the authorized number. The deputies are being trained in the use of the computer for investigative input and eventually will be trained for record retrieval. We are augmenting training on investigative requirements, hazardous materials and other requirements for these positions.

The religious objection to the autopsy has not been the legal problem that was suggested although this may become true in the future. Why this has not been a problem is unclear but the advertised public information push that the authors declared would be performed apparently was not or has not been used to force the issue.

Tissue donations are an increasing problem, and the deputies are involved more frequently in this issue. Considerable time is being spent in seeking hospital admission blood and urine, clothing and other evidence, since there is usually no attempt made to save this material at the hospital. We are currently working with the administration at San Francisco General Hospital and the tissue procurement centers to correct these problems.

There is continued training for the deputies, all being either current or the new hires to be current in PC832 requirements. We also are continuing our

in-house training and send some deputies each year to other programs. This aspect is unchanged from the description last year.

### III. TOXICOLOGY

Toxicology has continued to show the most departmental growth and expansion. The expansion of the laboratory is essentially complete, and the current construction is oriented toward laboratory safety and OSHA safety compliance. This project is in the final stages of planning, and construction will start at or immediately after the new year. In addition to the problems of compliance with the hazardous materials act, the necessity for training, inventory, disposal and purchasing are more than the staffing of the department can handle. We will be requesting one full time person to take the responsibility for this work as well as supporting the operations of the laboratory on a daily basis, freeing scientific staff to do their work. The volume of cases has increased considerably, and this is reflected for the first time in the report by showing some of the data on 11550, DUI, recruit and other types of cases handled by the department. There is simply no other place in the County where this capability and expertise is available and, as the needs of the courts and others grow, we expect the demands on this department to grow.

### IV. AUTOPSY FACILITIES

There has been a continuous increase in the use of the isolation room for infectious cases. We are aware of the increased use and costs associated with performing these cases. The facility is old enough that we will be requiring some significant capital monies for repair and update in the near future.

### V. INQUEST DIVISION

We have not experienced the anticipated problems with SB 1824 (Objection to the autopsy on religious grounds) that had been expected. The inquest has remained a valuable method of investigation and resolution, especially for manner of death. Again, because of the time and legal aspects of the proceedings, we would like to see the proceedings handled by a judge with the special background in forensic medicine necessary to the types of cases and issues heard.

### VI. FORENSIC PATHOLOGY DIVISION

This division continues to bear the brunt of the work load for court and evidence collection. More of the time of the staff is involved in teaching, case review for the District Attorney and Public Defender attorneys and review of cases involving living victims. The teaching program continues to be well accepted and we believe serves a vital purpose in the community.

## VII. CONSULTATION SERVICE

Expert consultation in the field of forensic medicine continues to consume a considerable amount of time and effort. We have tried to limit these cases so that the required departmental income is maintained, yet the staff time is controlled so that our primary responsibility to the department is met. Currently, only two of the staff routinely do consultations for which the department bills. The costs of travel and similar expenses are out-of-pocket, and there is no realistic method of reimbursement for these costs within the County framework. This, plus the demands of the courts and the time involved, detract from the department's work. On the other hand, the recognition and utilization of our capabilities in noteworthy cases shows the benefits of forensic medicine in the community, and offsets the costs to the taxpayer for these services.

We are part of an active child abuse prevention program through a committee designed to detect abuse or family stress in cases of death, and potentially to prevent similar incidents in siblings in the same family. We are also active in suicide prevention programs, and support drug abuse and poison control programs.

We are active in drunk driving programs, including detection, analysis, evaluation and court interpretation of evidence. This is partially within the Mayor's Drunk Driving Program, and partly through other programs. We routinely perform analysis of biological samples for the District Attorney, occasionally for the Public Defender, and, commonly for the Highway Patrol. We would then be subject to testify in court on the medical or toxicologic aspects of the case.

Our private consultants have volunteered hundreds of hours of painstaking work on medico-legal cases.

This office, working in conjunction with the Northern California Transplant Bank at Pacific Medical Center, was responsible for over 24 donors during fiscal year 1988-89. Approximately 30% of our referrals became donors, another example of serving the living.

Forensic medicine serves many useful purposes to this community. It is our goal to have a worthwhile and widely beneficial program that grows with the needs of the community for service to both the living and the dead.

DEPARTMENTAL COSTS

1988 - 1989

Total Budget	\$1,819,593.00
Transfers to controller, Health and Retirement	\$ 327,496.00
NET BUDGET (all other costs)	1,492,097.00
Total Cases	4,787
Cost per case investigated	\$ 312.00
Revenues (sales of records, public auctions, fee-for-service work)	\$ 45,238.00
Total Costs <u>Ad Valorum Taxes</u> per case Investigated	\$ 302.00

As indicated elsewhere, this includes all investigative, administrative, scientific and expert witness costs to the County.



CHIEF MEDICAL EXAMINER, CORONER'S OFFICE  
ORGANIZATION CHART

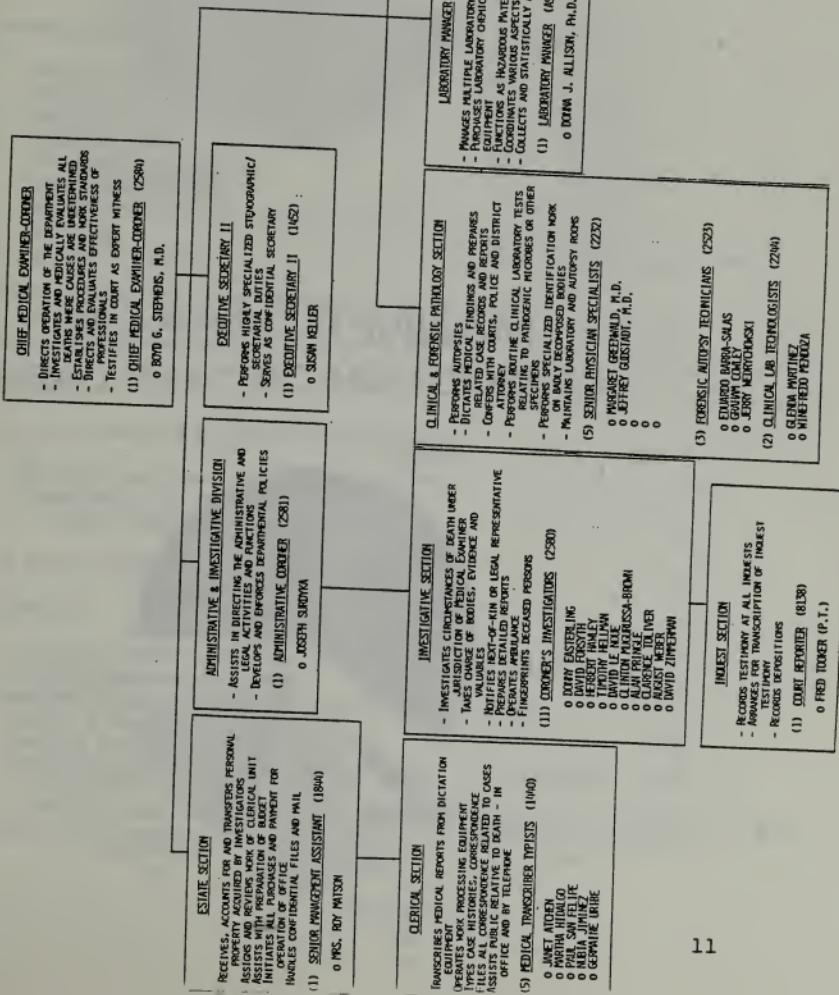


Figure 1 Deaths 1988-89  
City and County

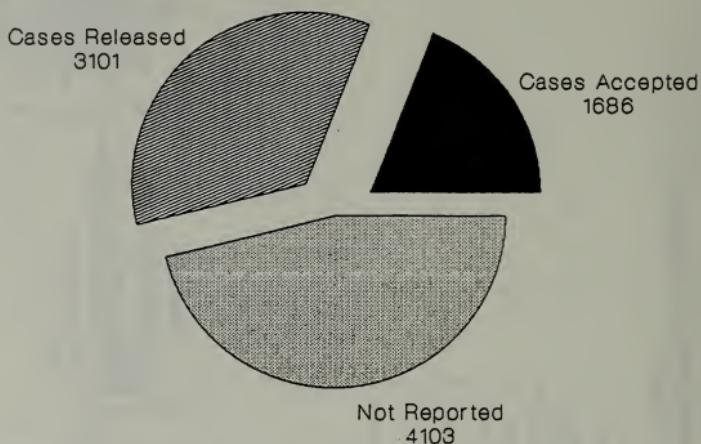
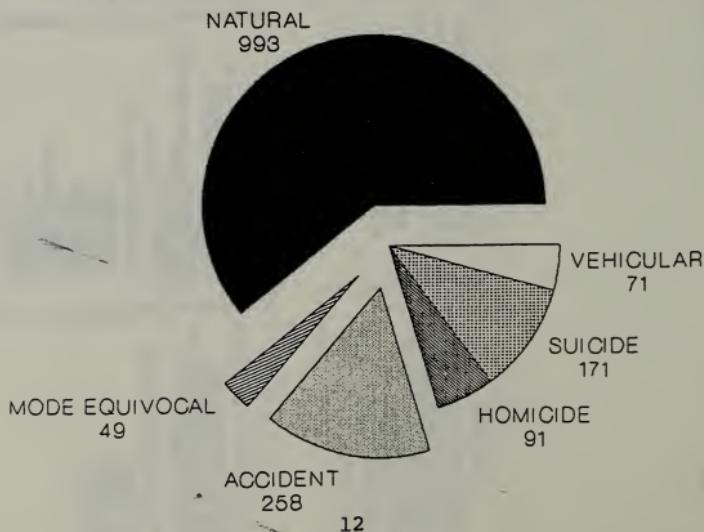


Figure 2. MANNER 1988-89  
JURISDICTION ON 1,686 CASES



FISCAL YEAR 1988-89

Total Deaths in County	8,890
Total Deaths Reported to Medical Examiner	4,787
Cases Reported, Investigated and Cleared by the Medical Examiner for physician's signature	3,101
Medical Examiner's Cases	1,686
% Reported to Medical Examiner	53.8
% County Deaths Having Medical Examiner's Jurisdiction	19.0

Cases Accepted by the Medical Examiner (by manner of death)\*

1. Natural Deaths (NC)	993	(58.9%)
2. Accidents (ACC)	258	(15.3%)
3. Suicides (SUI)	171	(10.1%)
4. Homicides (HOM)	91	(5.4%)
5. Mode Equivocal (EQ)	49	(2.9%)
6. Cause Unknown (UNK)	36	(2.1%)
7. Sudden Infant Death Syndrome (SIDS)	17	(1.0%)
8. Vehicular	71	(4.2%)
9. Private Autopsies	13**	

\*\*Not included in above figures.

Autopsies performed 1,330

Autopsy Index 79%

Dispositions Authorized by the Medical Examiner

1. Indigents and fetus dispositions	184
2. Cases buried by funeral home with Public Administrator-controlled funds	24

Inquests Held or Depositions Taken 40

Identification

1. Persons brought to Medical Examiner's Office with insufficient identification	213
2. Persons subsequently identified by fingerprints, dental X-rays or other means	210
3. Persons buried as unidentified	3
4. Fingerprints taken and forwarded to FBI, CII, or SFPD	1,579

\* The abbreviations following each manner of death will be used in most tables in this report.

In the fiscal year 1988-89, there were 8,890 deaths in San Francisco County. Of these deaths, 4,787 were reported to the San Francisco Medical Examiner-Coroner's Office. The Coroner's Investigators examined the previous medical history, circumstances surrounding the deaths and, in many cases, the scene of the death, and determined that 1,686 of these deaths came under the jurisdiction of this office. See Figure 1, page 12). Autopsies were performed on 79% of these cases.

1. The highest total number of deaths occurred in March, 1989, as did the highest number of accidental deaths. The highest number for other manners of death occurred during other months (e.g. highest number of suicides in both August and June, highest number of homicides in August). See Table I and Figure 3, page 15.
2. The racial distribution for each manner of death was quite variable. For example, the value of the ratio of whites/blacks was 3.0 for accidents, 14.0 for suicides and 0.8 for homicides. See Table II, page 16.
3. The age range distribution for each manner of death was also variable. For example, the highest number of accidental deaths and suicides occurred in the 30-39 year age group, while the highest number of homicides occurred in the 20-29 year age group. During this fiscal year as compared to the previous year, the number of accidental deaths in the age group of 20-59 years increased by 28%, from 154 to 197, while the number of such deaths in those age 60-69 decreased by nearly half, from 80 to 45. The reasons for these differences will be discussed in a later section on accidental deaths. See Table III, page 16.
4. The overall distribution of deaths by sex (ratio of male/female) was 2.0, but this varied by manner of death from 1.7 in deaths due to natural causes to 5.1 in homicide deaths. See Table IV and Figure 4, page 17.

MEDICAL EXAMINER CASES FOR 1988-89

TABLE I. MANNER OF DEATH - MONTHLY COMPARISON

Month of Death	Manner of Death								TOTALS
	ACC	HOM	SUI	NC	VEH*	SIDS#	EQ	UNK	
July	20	10	11	79	4	3	3	3	133
August	20	12	20	66	5	2	6	2	133
September	10	9	19	75	8	0	2	5	128
October	20	9	15	65	9	0	6	6	130
November	23	5	12	87	8	4	2	0	141
December	24	4	12	94	9	2	5	1	151
January	21	3	11	110	7	1	5	2	160
February	19	9	10	100	5	1	7	3	154
March	32	9	15	92	4	1	6	3	162
April	22	6	11	91	5	1	1	4	141
May	21	7	15	64	6	1	2	3	119
June	26	8	20	70	1	1	4	4	134
<b>TOTALS</b>	<b>258</b>	<b>91</b>	<b>171</b>	<b>993</b>	<b>71</b>	<b>17</b>	<b>49</b>	<b>36</b>	<b>1686</b>

Fig. 3

**MONTHLY COMPARISON  
MANNER**

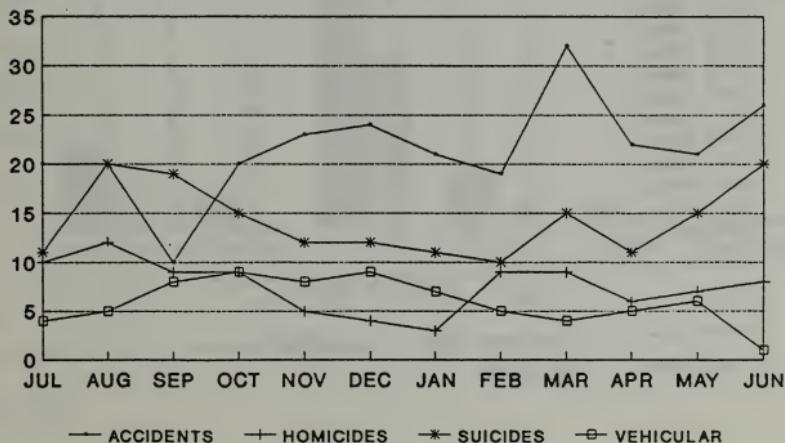


TABLE II. MANNER OF DEATH BY RACE

## Manner of Death

Race	ACC	HOM	SUI	NC	VEH*	SIDS#	EQ	UNK	TOTALS
White	179	35	140	735	48	8	30	21	1196
Black	59	42	10	168	12	8	21	5	289
Asian	14	11	19	104	14	1	4	0	178
Other	6	3	2	14	4	1	1	1	23
TOTALS	258	91	171	993	71	17	49	36	1686

\* VEH = Vehicular deaths. These include 16 deaths ruled to be homicide, 51 cases ruled to be accidental, and 4 cases ruled to be equivocal

# SIDS = Sudden Infant Death Syndrome

TABLE III. MANNER OF DEATH BY AGE

## Manner of Death

Age Group	ACC	HOM	SUI	NC	VEH*	EQ	UNK	TOTALS
0-11 months	3	0	0	26#	0	0	7	36
1-5 years	3	0	0	1	2	0	0	6
6-12 years	0	0	0	1	3	0	0	4
13-16 years	1	3	1	0	1	0	0	6
17-19 years	2	11	2	0	2	1	0	18
20-29 years	39	28	30	10	9	8	7	131
30-39 years	78	24	33	63	17	12	7	234
40-49 years	57	13	28	93	10	12	4	217
50-59 years	23	7	22	139	3	7	3	204
60-69 years	18	4	19	219	8	6	4	278
70-79 years	17	0	21	220	9	0	1	268
80-89 years	10	1	11	187	6	1	0	216
90+ years	6	0	3	51	1	1	0	62
Unknown	1	0	1	0	0	1	3	6
TOTALS	258	91	171	1010	71	49	36	1686

# Includes 17 SIDS deaths

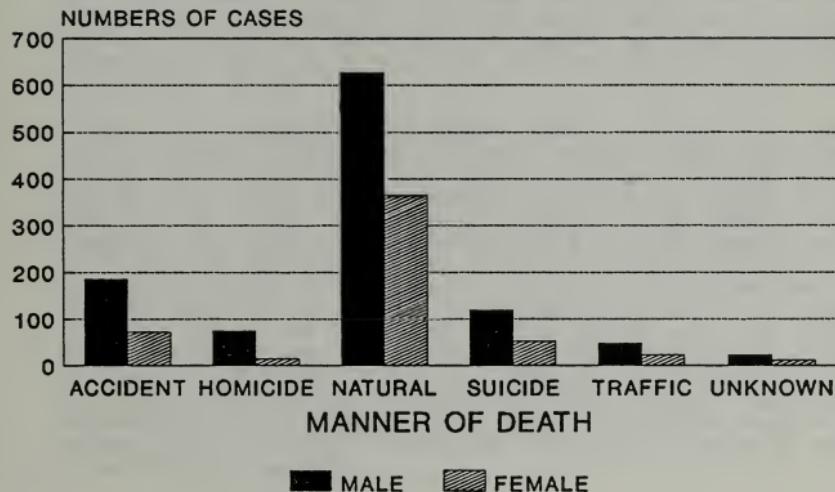
TABLE IV. MANNER OF DEATH BY SEX

## Manner of Death

Sex	ACC	HOM	SUI	NC	VEH*	SIDS#	EQ	UNK	TOTALS
M	186	76	119	628	48	10	33	23	1123
F	72	15	52	365	23	7	16	12	562
Unknown	0	0	0	0	0	0	0	1	1
<b>TOTALS</b>	<b>258</b>	<b>91</b>	<b>171</b>	<b>993</b>	<b>71</b>	<b>17</b>	<b>49</b>	<b>36</b>	<b>1686</b>

\* = Vehicular deaths. These include 16 cases ruled to be homicide, 62 cases ruled to be accidental and 4 ruled to be Mode Equivocal.

Figure 4. **MANNER OF DEATH  
BY SEX**





## YEARLY COMPARISON OF MEDICAL EXAMINER - CORONER'S CASES

Comparisons of manners of death as well as methods used over the last eight fiscal years are presented in this section. The most significant differences which have occurred over the last eight years which can be observed in these tabulations include:

1. Regarding manners of death, the number of homicides (91) during fiscal year 1988-89 is the lowest number for any fiscal year since 1983-84 and is 17% lower than fiscal year 1987-88. The number of deaths from natural causes which came under the jurisdiction of this office is the lowest that it has been over the last eight years. Otherwise, there seems to be a general cyclic nature to the changes seen in the numbers of people dying from each manner over the eight year period. (See Table V and Figure 5, page 20 and Figure 2, page 12).
2. With respect to the methods used in homicide deaths, the most notable difference from the previous fiscal year is a 40% decrease in deaths due to stabbing. The number of deaths occurring as a result of stabbing (21) was the lowest number observed for any year in the last eight years. Deaths from firearms and traumatic injuries decreased in the mid-80's but have subsequently increased (See Table VI and Figure 6, page 21).
3. The number of suicide deaths resulting from jumps from buildings increased dramatically from the previous fiscal year, from 19 to 30, the highest number of deaths from jumps from buildings for any year over the last eight years. The number of suicide deaths due to hanging decreased from 28 in 1987-88 to 17 in 1988-89, the lowest number of deaths from hanging in any year over the last eight years (See Table VII and Figure 7, page 22).
4. A very striking finding in the deaths ruled to be accidental is the steady increase in deaths due to drugs, with more than a 3.5 fold increase in the number over the eight year period. From 1987-88 to 1988-89, there was a jump in the number of accidental deaths due to drugs from 100 to 144. The number of accidental deaths resulting from asphyxia is the highest since 1982-83, with a 4 fold increase (from 2 to 8) from 1987-88 to 1988-89. The number of accidental deaths due to aspiration decreased by one-half over the previous fiscal year and is 75% lower currently than in 1980-81. The number of deaths due to burns in 1988-89 (3) is down from a high of 38 in 1982-83 and is the lowest number seen in the last eight years. The number of deaths from falls has decreased substantially, from 97 in 1981-82 to 54 in 1988-89, also the lowest number seen over the last eight years. However, the number of deaths from falls is still second only to deaths from drugs as a leading cause of accidental deaths (See Table VIII and Figure 8, page 23 and Figure 9, page 24).

YEARLY COMPARISONS OF MEDICAL EXAMINER-CORONER'S CASES

TABLE V. YEARLY COMPARISON OF MANNER OF DEATH

Fiscal year

Manner of Death	'81-'82	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88	'88-'89
Accident	240	245	230	214	231	222	258	258
Homicide	132	103	84	95	120	110	110	91
Suicide	183	173	182	153	161	171	162	171
Natural	1139	1154	1082	1210	1150	1040	1074	1010
Vehicular*	74	74	51	60	61	46	75	71
Equiv/Undet	67	55	42	55	63	62	82	85
TOTALS	1835	1804	1671	1787	1786	1651	1761	1686

\* Vehicular deaths include 16 cases ruled to be homicide, 51 cases ruled to be accidental, and 4 cases ruled to be Mode Equivocal or Undetermined.

**Figure 5. MANNER OF DEATH COMPARISON BY YEAR**

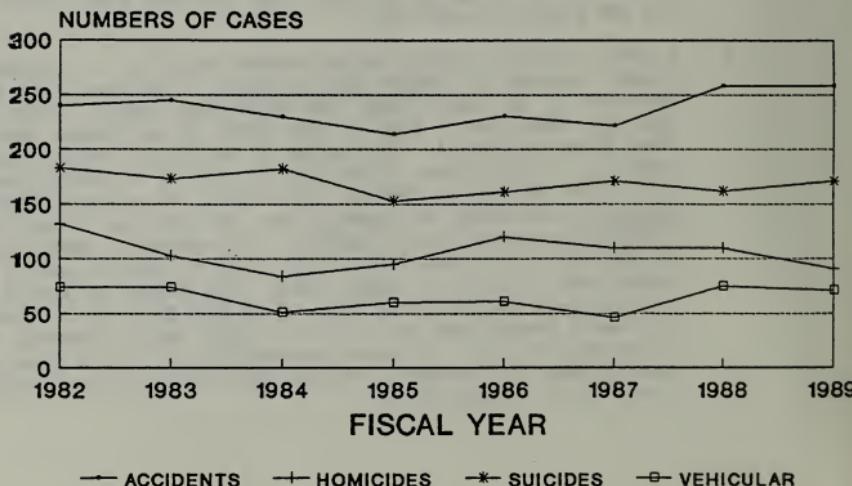
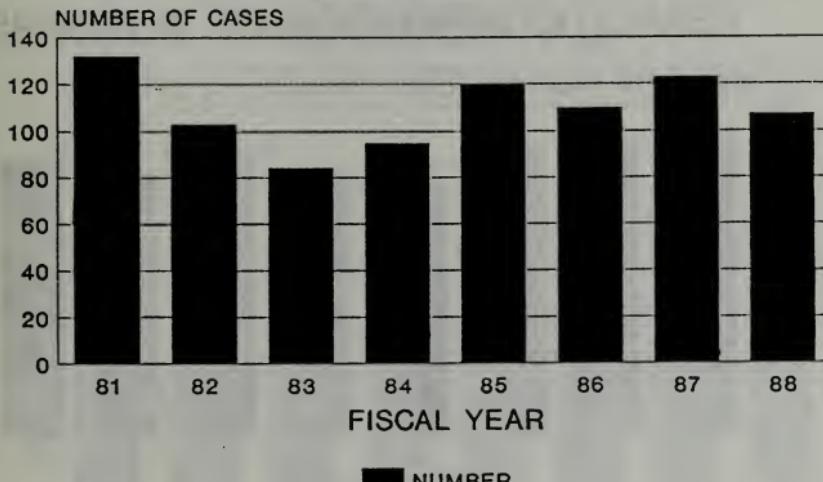


TABLE VI. YEARLY COMPARISON OF HOMICIDE METHODS USED

Fiscal year

Method Used	'81-'82	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88	'88-'89
Asphyxiation	12	12	8	8	8	8	3	5
Traum. Inj.	14	5	5	19	18	21	23	22
Firearms	64	47	27	26	40	41	48	41
Stabbing	33	28	26	31	34	32	35	21
Vehicular	-	-	10	7	11	7	13	16
Other	9	1	5	4	9	1	1	2
TOTALS	132	103	84	95	120	110	123	107

Figure 6. **HOMICIDES**  
**YEARLY COMPARISON OF NUMBERS**



FISCAL YEAR

TABLE VII. YEARLY COMPARISON OF SUICIDE METHODS USED

Fiscal year

Method Used	'81-'82	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88	'88-'89
Poisoning	50	46	38	34	36	32	32	44
Jump/GG Brdg	18	22	19	18	17	19	18	15
Jump/Bay Brdg	1	1	2	0	0	1	1	2
Jump/Building	20	16	23	15	16	19	19	30
CO Poisoning	4	7	4	8	6	6	2	2
Asphyxia	2	2	1	1	2	3	7	7
Hanging	27	26	28	29	28	29	28	17
Cut/stab	8	7	10	4	5	9	8	5
Firearms	48	36	48	34	46	45	42	44
Drowning	2	9	1	0	3	6	3	2
Burning	1	6	2	0	1	0	0	2
Other	2	1	2	10	1	2	2	1
TOTALS	183	179	178	153	161	171	162	171

Figure 7. **SUICIDES**  
**YEARLY COMPARISON OF NUMBERS**

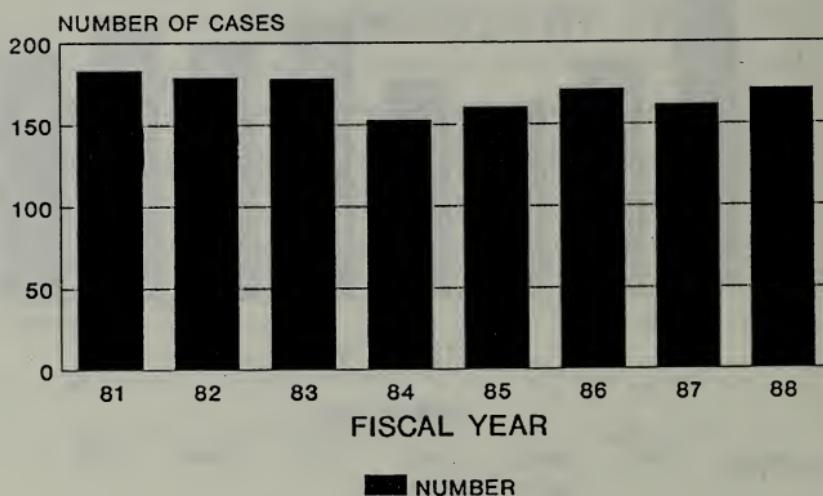


TABLE VIII. YEARLY COMPARISON OF ACCIDENTAL\* DEATH SITUATIONS

Fiscal year

Situation	'81-'82	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88	'88-'89
Drugs/Poisons	44	71	66	78	96	92	100	144
Aspiration	24	21	9	14	7	8	10	5
Drowning	13	12	3	6	9	5	14	11
Asphyxia	-	3	3	2	6	4	2	8
Firearms	3	1	1	1	2	1	1	3
Smoke inhal.	8	3	1	3	0	9	8	11
Burns	24	38	33	14	15	6	12	3
Falls	97	68	82	74	67	80	76	54
Med. Misadv.	-	-	-	-	-	12	13	6
Hanging	-	-	-	-	-	-	2	2
Drug/Alcohol Abuse Rel.	-	-	-	-	-	-	13	9
Other	27	28	35	22	29	3	7	2
TOTALS	240	245	230	214	231	222	258	258

\* Vehicular deaths are not included in this tabulation.

Figure 8. **ACCIDENTAL**  
**YEARLY COMPARISON OF NUMBERS**

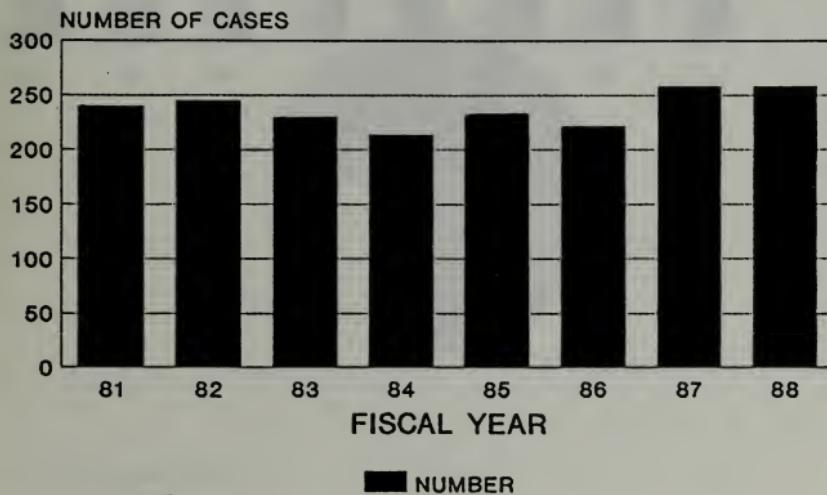


Figure 9.

## YEARLY COMPARISON OF ACCIDENTAL DEATHS DUE TO DRUGS, ASPIRATION AND FALLS

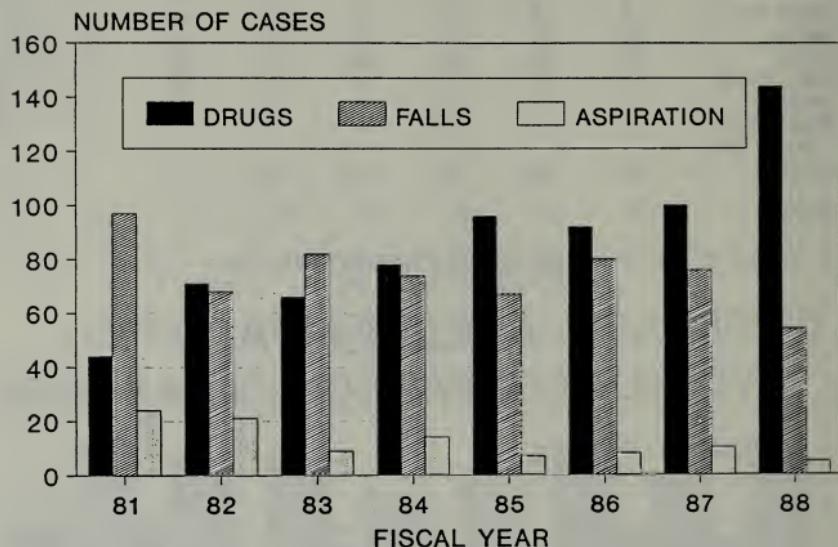


TABLE IX. VIOLENT DEATHS

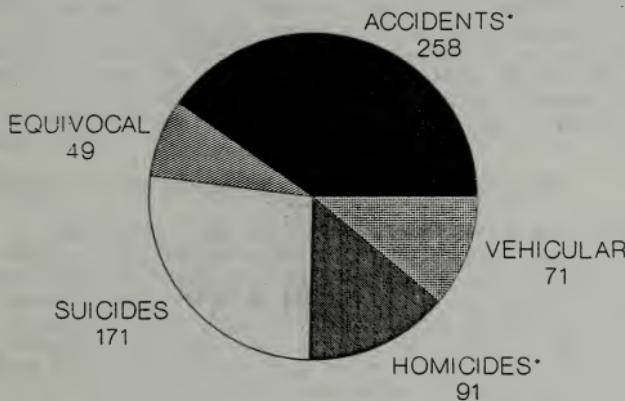
Of the 1,686 deaths investigated by the Medical Examiner's Office during 1988-89, 640 were determined to be the result of violence.

Mode	Total No.	% of Coroner's Cases	% of County Deaths
ACCIDENT	309	18.3	3.5
Vehicular	51	3.0	
Non-vehicular	258	15.3	
SUICIDE	171	10.0	1.9
HOMICIDE	107	6.3	1.2
Vehicular	16	0.9	
Non-vehicular	91	5.4	
EQUIVOCAL	53	3.1	0.6
Vehicular	4	0.2	0.04
Non-vehicular	49	2.9	0.6

## VIOLENT DEATHS IN 1988-89

Total = 640

Figure 10.



• • NON-VEHICULAR



## ACCIDENTAL DEATHS

Three hundred and nine deaths were ruled to have been due to accidental means during the 1988-89 fiscal year. The number of individuals dying by each manner of accidental death are indicated in Figure 11, page 28 and Table X, page 30, and the percentages of all accidental deaths represented by each manner are indicated on Table X, page 30.

Of the accidental death victims tested for alcohol and drugs (i.e. those in the hospital for less than 24 hours), a large percentage had significant levels of alcohol in their blood as well as having drugs present (See Table X, page 30).

### Abuse Drug Involvement (Table XI, page 31).

Overall, the number of accidental death cases where abuse drugs were present increased from fiscal year 1987-88 (131 cases) to fiscal year 1988-89 (187 cases), a 43% increase. Of the deaths caused by drugs, heroin (measured as morphine) was seen most frequently. The second most frequently seen abuse drug was cocaine. While the number of cases with cocaine present increased by 28% from the previous fiscal year (50 to 64), the number of cases with heroin present increased 96%, from 52 to 102 cases. Abuse drugs may have played a role in accidental deaths by fall (1 case), drowning (1 case) and asphyxia (2 cases).

### Racial Distribution (Figure 12, page 32 and Table XII, page 33).

Overall, accidental deaths occurred most frequently in whites. While deaths due to falls occurred most frequently in whites, the number of deaths from falls decreased significantly in whites, from 55 in 1987-88 to 35 in 1988-89. Accidental deaths due to asphyxia appear to occur more frequently in whites and less frequently in Asians than would be anticipated by the overall involvement of these racial groups in accidental deaths. Also, Asians are more heavily represented in vehicular deaths, and deaths by hanging, firearms and aspiration than would be expected based on the general involvement of Asians in all types of accidental deaths.

### Age Distribution (Figure 13, page 34 and Table XIII, page 35).

Deaths due to asphyxia and medical misadventures are the most common causes of accidental deaths in the youngest age group (0-5 years). The most common causes of accidental deaths in people over 60 years of age are aspiration (100% of all aspiration deaths), burns (100% of all deaths due to burns), falls (55% of all deaths due to falls), smoke inhalation (45% of all deaths due to smoke inhalation), and vehicular accidents (40% of all such deaths). While 71% of deaths resulting from falls occurred in those older than 60 years during the previous fiscal year, only 55% of all deaths from falls occurred in this age group during 1988-89. There was a corresponding decrease in the number of people over age 60 dying as a result of a fall - from 54 in 1987-88 to 30 in 1988-89. Deaths due to drug overdoses are concentrated in the 20-49 year age group with 42% of all deaths due to drug overdoses in the 30-39 year age group.

Distribution by Sex (Table XIV, page 36).

Males are more than twice as likely as females to be the victims of accidental deaths. This difference is even more pronounced in deaths due to falls, drowning, firearms, hanging and drug overdoses. This difference is less pronounced in deaths due to aspiration, burns and smoke inhalation. The percentage decrease from the previous fiscal year in deaths due to falls involved deaths in females (50% decrease) more markedly than deaths in males (19% decrease).

## NON-VEHICULAR ACCIDENTS

This category includes all unintentional fatalities. There were 258 accidental deaths (non-vehicular) which accounted for 15% of the Medical Examiner death investigations for the fiscal year of 1988-89.

### CIRCUMSTANCES OF NON-VEHICULAR ACCIDENTAL DEATHS IN 1988-89

#### TYPES OF DEATHS

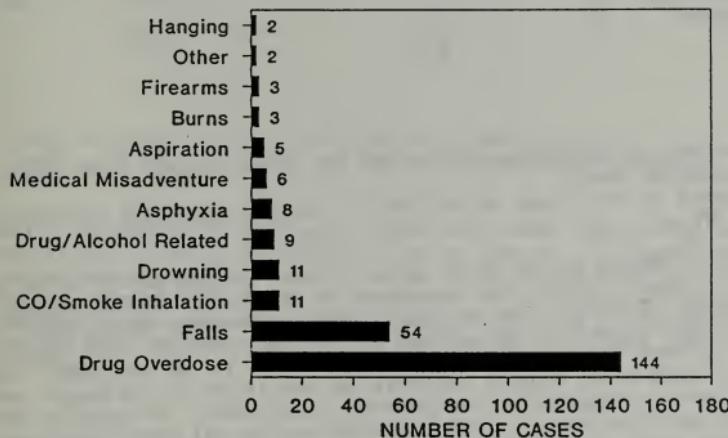


Figure 11.

TABLE X. ACCIDENTAL DEATHS BY MODE

Drug and Alcohol Involvement

METHOD	NUMBER	% OF TOTAL ACCIDENTS	% ALC.*	AVE. ALC. CONC (g%)	% DRUGS**
ASPHYXIA	8	2.6	38	0.12%	33
ASPIRATION	5	1.6	20	0.20%	-
BURNS	3	0.9	-	-	-
FALLS	54	17.5	38	0.16%	9
DROWNING	11	3.6	30	0.26%	13
DRUG O.D.	144	46.6	46	0.20%	100
DRUG/ALC.	9	2.9	0	-	100
ABUSE REL.					
FIREARMS	3	0.9	33	0.16%	0
HANGING	2	0.6	50	0.14%	0
MEDICAL	6	1.9	-	-	-
MI SADVENTURE					
SMOKE/CO INHALATION	11	3.6	36	0.20%	9
VEHICULAR	51	16.5	34	0.22%	9
OTHER	2	0.6	0	-	0

\* Refers to percentage of victims (of those tested) with positive blood ethyl alcohol levels.

\*\* Refers to percentage of victims (of those tested) with positive tests for abuse drugs.

Except for deaths due to burns, those related to drug/alcohol abuse and those due to "other" causes, the percentage of cases with alcohol present has increased or stayed the same as compared to the previous fiscal year. Overall, alcohol was present in the systems of over one-third of those dying in accidents and may have been a contributing factor in the accident. Also, the average blood ethyl alcohol concentration has increased for nearly every mode of accident as compared to the previous fiscal year. It should be noted that the average blood ethyl alcohol concentrations for all modes, when present, are over the level of 0.10% which is considered to be intoxicated when driving. Interestingly, the percentage of cases with drugs present (except for those due to drug overdoses) has decreased from the preceding fiscal year. These decreases were most striking in deaths due to falls (a decrease from 25% to 9%), deaths due to drowning (a decrease from 71% to 13%) and in vehicular deaths (a decrease from 28% to 9%).

TABLE XI. ABUSE DRUGS PRESENT IN NON-VEHICULAR ACCIDENTS

<u>Situation</u>	<u>DRUGS</u>			
	<u>Cocaine</u>	<u>PCP</u>	<u>Morphine</u>	<u>Amphetamines</u>
ASPHYXIA/SUFFOCATION	2	0	0	0
ASPIRATION	-	-	-	-
BURNS	-	-	-	-
FALLS	1	0	0	0
DROWNING	1	0	0	0
DRUG/ALCOHOL ABUSE REL.	3	0	3	1
FIREARMS	0	0	0	0
HANGING	0	0	0	0
MEDICAL MISADVENTURE	-	-	-	-
DRUG OVERDOSE	56	2	99	18
SMOKE/CO INHALATION	1	0	0	0
OTHER	0	0	0	0
TOTALS	64	2	102	19

\* Drugs may have been present singly or in combination

\*\* Drugs used therapeutically are not included in this tabulation

Overall, the number of accidental death cases where abuse drugs were present increased 43%, from 131 in 1987-88 to 187 in 1988-89. The number of deaths due to an overdose of cocaine increased from 41 in 1987-88 to 56 in 1988-89, a 37% increase. However, the number of deaths due to an overdose of heroin (measured as morphine), increased 110%, from 47 in 1987-88 to 99 in 1988-89. The number of deaths where PCP and amphetamines were present decreased from the previous fiscal year.

## RACE OF ACCIDENT VICTIMS FY 1988-89

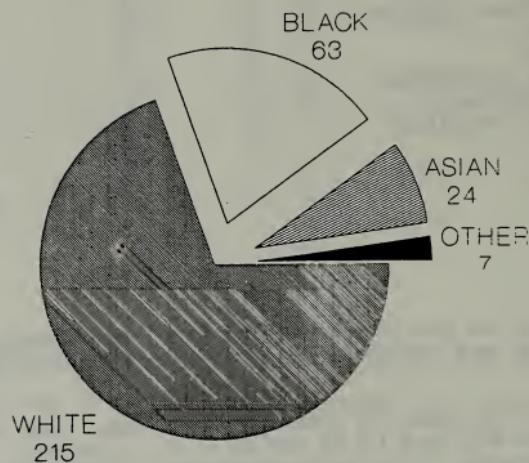


Figure 12.

TABLE XII. ACCIDENTAL DEATH SITUATIONS BY RACE

	<u>Race</u>				
	<u>White</u>	<u>Black</u>	<u>Asian</u>	<u>Other</u>	<u>Total</u>
<u>Method</u>					
Asphyxia	7 (88%)*	1 (12%)	0	0	8
Aspiration	3 (60%)	0	2 (40%)	0	5
Burns	3 (100%)	0	0	0	3
Falls	35 (65%)	10 (19%)	7 (13%)	2 (4%)	54
Drowning	8 (73%)	2 (18%)	0	1 (9%)	11
Drug/Alcohol Abuse Rel	2 (22%)	6 (67%)	1 (11%)	0	9
Firearms	1 (33%)	0	2 (67%)	0	3
Hanging	1 (50%)	0	1 (50%)	0	2
Medical Misadventure	5 (83%)	0	1 (17%)	0	6
Drug O.D.	106 (74%)	37 (26%)	0 (0.7%)	1	144
Smoke/CO Inhalation	8 (73%)	2 (18%)	0 (9%)	1	11
Vehicular	36 (71%)	4 (8%)	10 (20%)	1 (2%)	51
Other	0	1 (50%)	0 (50%)	1	2
<b>Totals</b>	<b>215 (70%)</b>	<b>63 (20%)</b>	<b>24 (8%)</b>	<b>7 (2%)</b>	<b>309</b>

\* Row percentages refer to percentages by race for each mode. These can be compared to total percentages for each race to see whether a mode is more or less prevalent in a racial group. For instance, asphyxial deaths appear to occur more frequently in whites (88%) than the general involvement of whites in accidents (70%). Vehicular deaths occur more frequently in Asians (20%) and less frequently in blacks (8%) than would be predicted by the involvement of these racial groups in accidents overall.

## AGE OF ACCIDENTAL DEATH VICTIMS FY 1988-89

AGE IN YEARS

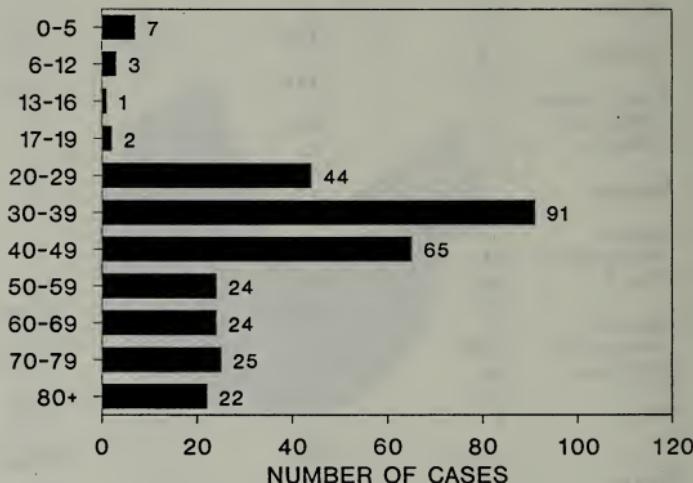


Figure 13.

TABLE XIII. ACCIDENTAL DEATH SITUATIONS BY AGE

Age Range

<u>Method</u>	<u>0-5</u>	<u>6-12</u>	<u>13-16</u>	<u>17-19</u>	<u>20-29</u>	<u>30-39</u>	<u>40-49</u>	<u>50-59</u>	<u>60-69</u>	<u>70-79</u>	<u>80+</u>	<u>Unk</u>
Asphyxia	3 (38%)*	0	0	0	0	3 (38%)	1 (12%)	0	0	1 (12%)	0	0
Aspiration	0	0	0	0	0	0	0	0	1 (20%)	1 (20%)	3 (60%)	0
Burns	0	0	0	0	0	0	0	0	1 (33%)	1 (33%)	1 (33%)	0
Falls	0	0	0	1 (2%)	3 (6%)	8 (15%)	6 (11%)	6 (11%)	12 (22%)	11 (20%)	7 (12%)	0
Drowning	1 (9%)	0	0	0	4 (36%)	0	2 (18%)	0	1 (9%)	0	2 (18%)	1 (9%)
Drug/Alc Abuse Rel	0	0	0	0	2 (22%)	1 (11%)	4 (44%)	1 (11%)	0	0	1 (11%)	0
Firearms	0	0	0	0	1 (33%)	2 (67%)	0	0	0	0	0	0
Hanging	0	0	1 (50%)	0	0 (50%)	1	0	0	0	0	0	0
Medical Misad.	2 (33%)	0	0	0	0	0	2 (33%)	2 (33%)	0	0	0	0
Drug O.D.	0	0	0	1 (1%)	28 (19%)	59 (41%)	39 (27%)	14 (10%)	2 (1%)	1 (1%)	0	0
Smoke/CO Inhal.	0	0	0	0	1 (9%)	3 (27%)	2 (18%)	0	1 (9%)	2 (18%)	2 (18%)	0
Vehicular	1 (2%)	3 (6%)	0	0	5 (10%)	13 (25%)	8 (16%)	1 (2%)	6 (2%)	8 (12%)	6 (16%)	0 (12%)
Other	0	0	0	0	0 (50%)	1 (50%)	1 (50%)	0	0	0	0	0
<b>TOTALS</b>	<b>7</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>44</b>	<b>91</b>	<b>65</b>	<b>24</b>	<b>24</b>	<b>25</b>	<b>22</b>	<b>1</b>
<b>% OF TOTAL</b>	<b>2%</b>	<b>1%</b>	<b>.3%</b>	<b>.6%</b>	<b>14%</b>	<b>29%</b>	<b>21%</b>	<b>8%</b>	<b>8%</b>	<b>8%</b>	<b>7%</b>	<b>.3</b>

\* Row percents refer to percentage by age range for each mode. These can be compared to total percentages for each age range to see if a mode is more or less prevalent in an age group. For example, asphyxia occurred more frequently in the 0-5 years of age group (38%) than the general involvement of this age group in accidents (2%) while falls in the 30-39 year age group (15%) occurred less frequently than all accidents in this age group (29%).

TABLE XIV. ACCIDENTAL DEATH SITUATIONS BY SEX

<u>Method</u>	<u>Sex</u>	
	<u>Male</u>	<u>Female</u>
Asphyxia	4 (50%)*	4 (50%)
Aspiration	2 (40%)	3 (60%)
Burns	1 (33%)	2 (67%)
Falls	42 (78%)	12 (22%)
Drowning	9 (82%)	2 (18%)
Drug/Alcohol	5 (56%)	4 (44%)
Abuse Related		
Firearms	3 (100%)	0
Hanging	2 (100%)	0
Medical Misadven.	3 (50%)	3 (50%)
Drug O.D.	108 (75%)	36 (25%)
Smoke/CO Inhal.	5 (45%)	6 (55%)
Vehicular	35 (69%)	16 (31%)
Other	2 (100%)	0
TOTALS	221	88
% OF TOTAL	72%	28%

\* Row percents refer to percentages by sex for each mode. These can be compared to total percentages for each sex to see whether a mode is more or less prevalent in one sex. For example, drowning appears to occur more frequently in males (82%) than the general involvement of males in accidents (72%), while deaths by asphyxiation occur more frequently in females (50%) than all accidents in females (28%).

## VEHICULAR DEATHS

In the 1988-89 fiscal year, there were seventy-one vehicular fatalities in San Francisco. The number of vehicular fatalities by type are indicated in Figure 14, page 38 and Table XV, page 39. The percentages of all vehicular fatalities represented by each type are shown on Table XV page 39. The largest number of vehicular fatalities involved pedestrians; the second largest number involved automobile drivers. It is interesting to note that the number of automobile driver fatalities decreased by 50% from 1987-88 (28) to 1988-89 (14) while the number of pedestrian fatalities increased by 50%, from 24 in 1987-88 to 36 in 1988-89.

Of the vehicular fatalities tested for alcohol (i.e. those in the hospital for less than 24 hours), automobile and motorcycle drivers showed a positive test for ethyl alcohol more frequently than any other specific type of vehicular fatality. Automobile drivers had the highest average blood ethyl alcohol concentration (0.24%); pedestrians had the second highest level (0.23%). Automobile drivers and passengers were those vehicular fatalities with the highest percentages of drugs present.

### Abuse Drug Involvement (Table XVI, page 39)

Cocaine was the abuse drug seen most frequently in vehicular fatalities (3 cases) followed in frequency by heroin and amphetamines (1 case each). The number of vehicular fatalities with abuse drugs present was 5 during the current fiscal year as compared to 15 during the 1987-88 fiscal year, a 67% decrease!

### Age Distribution (Table XVII, p. 40, Table XVIII, p. 41, and Figure 15, p. 40)

The average age of motorcycle drivers was 35 years as compared to the average age of automobile drivers (40 years) and automobile passengers (23 years) who were vehicular fatalities during 1988-89. The mean age of pedestrians dying as traffic fatalities was the highest seen for any type of traffic fatality (60 years) with the 60 year and over age groups being overrepresented in the pedestrian fatalities (61%) as compared to their overall involvement in traffic fatalities (34%).

### Distribution by Sex (Table XVIII, page 41)

Males were the predominant victims in all types of traffic fatalities.

### Racial Distribution (Table XVIII, page 41 and Figure 16, page 41)

Overall, vehicular fatalities occur more frequently in whites. This also was true for most types of vehicular fatalities separately. Asians were represented more heavily among deaths of pedestrians and automobile passengers than would have been expected by their involvement in all vehicular fatalities.

## VEHICULAR DEATHS

In San Francisco, there were 71 vehicle-related fatalities (51 accidents, 16 homicides and 4 deaths ruled to be equivocal), accounting for 4% of the Medical Examiner death investigations for the fiscal year 1988-89.

### TYPES OF VEHICULAR DEATHS FY 1988-89

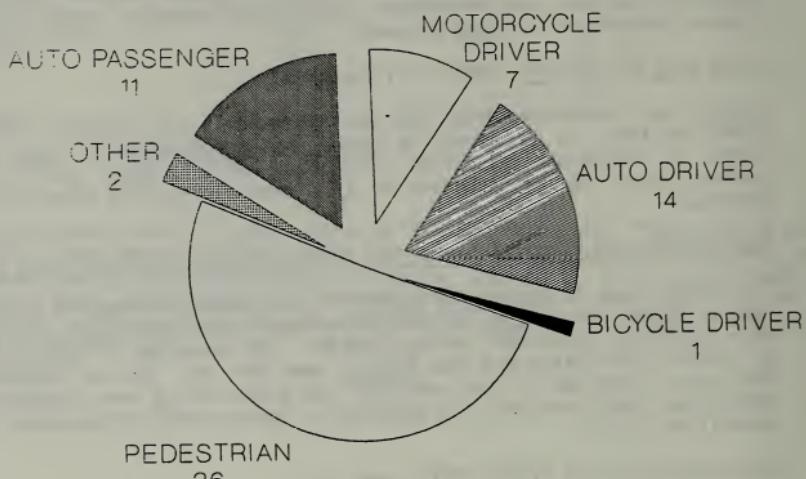


Figure 14.

TABLE XV. VEHICULAR FATALITIES IN 1988-1989

Drug and Alcohol Involvement

<u>METHOD</u>	<u>NO.</u>	<u>% WITH ALCOHOL*</u>	<u>AVE. ALC. CONC. (g%)</u>	<u>% WITH DRUGS*</u>	<u>% WITH DRUGS+ALC</u>
BICYCLE DRIVER	1 ( 1%)	-	-	-	-
AUTO DRIVER	14 (20%)	58	0.24	17	8
AUTO PASSENGER	11 (15%)	36	0.19	11	11
MOTORCYCLE DRIVER	7 (10%)	50	0.17	0	-
MOTORCYCLE PASSENGER	0	-	-	-	-
PEDESTRIAN	36 (51%)	15	0.23	4	0
OTHER/UNKNOWN	2 ( 3%)	0	-	100	100

\* Refers to percentages of victims (of those tested) with positive blood ethyl alcohol levels.

\*\* Refers to percentage of victims (of those tested) with positive blood tests for abuse drugs.

TABLE XVI. ABUSE DRUGS PRESENT IN VEHICULAR FATALITIES

<u>Situation</u>	<u>Drugs</u>				
	<u>Cocaine</u>	<u>PCP</u>	<u>Heroin</u>	<u>Amphetamines</u>	<u>THC</u>
BICYCLE DRIVER	0	0	0	0	0
AUTO DRIVER	1	0	0	0	0
MOTORCYCLE DRIVER	0	0	0	0	0
AUTO PASSENGER	0	0	0	1	0
PEDESTRIAN	1	0	1	0	0
UNKNOWN/OTHER	1	0	0	0	0
TOTALS	3	0	1	1	0

TABLE XVII. VEHICULAR FATALITIES BY AGE

<u>Situation</u>	<u>Age</u>										
	0-5	6-12	13-16	17-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
BICYCLE DRIVER	0	1 (100%)	0	0	0	0	0	0	0	0	0
AUTO DRIVER	0	0	0	0	4 (29%)	4 (29%)	3 (21%)	1 (7%)	2 (14%)	0	0
AUTO PASSENGER	2 (18%)	0	1 (9%)	2 (18%)	2 (18%)	3 (27%)	1 (9%)	0	0	0	0
MOTORCYCLE DRIVER	0	0	0	0	0	7 (100%)	0	0	0	0	0
PEDESTRIAN	0 (6%)	2	0	0	2 (6%)	2 (6%)	6 (17%)	2 (6%)	6 (17%)	9 (25%)	7 (19%)
OTHER/UNKNOWN	0	0	0	0	1 (50%)	1 (50%)	0	0	0	0	0
TOTALS	2	3	1	2	9	17	10	3	8	9	7
% of total	(3%)	(4%)	(1%)	(3%)	(13%)	(24%)	(14%)	(4%)	(11%)	(13%)	(10%)

\* Row percents refer to percentages by age group for each situation. These can be compared to total percentages for each age group to see if a situation is more or less prevalent in one age group. For example, accidental deaths of automobile passengers appear to occur more frequently in the 17-19 year age group (18%) than the general involvement of this age group in fatal vehicular accidents (3%), while accidental deaths of pedestrians in the 30-39 year age group (6%) occur less frequently than all vehicular accidents in this age group (24%).

### VEHICULAR DEATHS BY AGE FY 1988-89

AGE (yr)

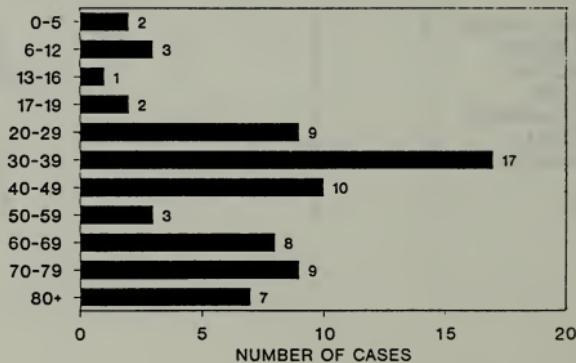


Figure 15.

TABLE XVIII. DEMOGRAPHICS OF VEHICULAR FATALITIES

<u>Situation</u>	<u>Sex</u>		<u>Race</u>				<u>Age</u>		
	<u>%M</u>	<u>%F</u>	<u>%W-NH</u>	<u>%W-H</u>	<u>%B-NH</u>	<u>%A</u>	<u>%O</u>	AVE.	AGE
AUTO DRIVER	79	21	50	29	7	14	0	40	
AUTO PASSENGER	55	45	55	18	0	27	0	23	
MOTORCYCLE DRIVER	100	0	71	14	0	0	14	35	
PEDESTRIAN	58	42	33	14	8	28	17	60	
BICYCLE DRIVER	100	0	100	0	0	0	0	9	
OTHER/UNKNOWN	100	0	50	0	50	0	0	29	
AVERAGE	68	32	45	17	7	21	10	46	

\* For discussion of meaning of row percentages, see previous page.

## RACE OF VEHICULAR DEATH VICTIMS FY 1988-89

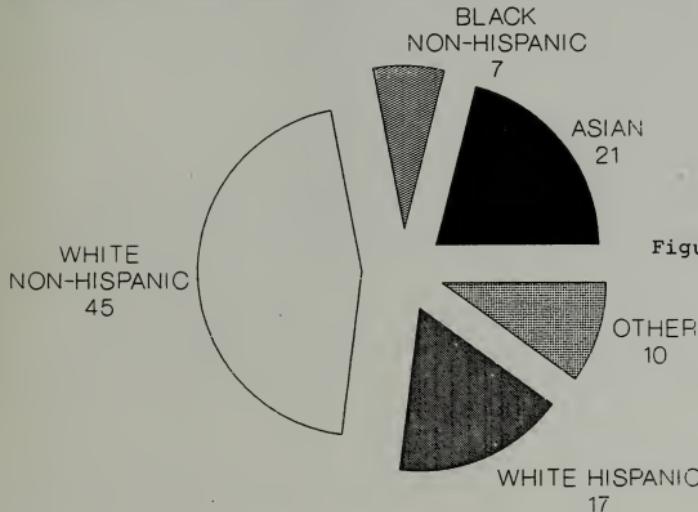


Figure 16.



## SUICIDES

The determination of suicide as a manner of death represents the summation of scene investigation, including a review of psychological state, autopsy, pathology, toxicology and, frequently, other investigation. To the best of our knowledge, ours is the only Medical Examiner's Office routinely performing toxicology testing on multiple organs and/or body fluids in order to evaluate the metabolic status of a drug or drugs.

Realizing the immense emotional impact on family, the diagnosis of suicide is never made lightly, and always represents a decision made on the basis of data sufficient to defend that decision in a court of law, if necessary. Should these data be inconclusive, the victim automatically gets the benefit of the doubt.

Suicide takes a tremendous toll of our young people. The relative number jumping from the Golden Gate bridge would not seem to warrant the publicity assigned them as compared to the evident need for help for individuals using other methods.

To help understand the problem, and, hopefully, to aid in reduction of suicides, this office has supported suicide prevention and research programs for many years. It is hoped that this work will help to reduce this needless loss.

The majority of these deaths are situational reactions, and, if given momentary trained support, are potentially preventable.

## SUICIDAL DEATHS

One hundred and seventy-one deaths were ruled to have been due to suicide during the 1988-89 fiscal year. The number of individuals dying by each method of suicide are presented in Figure 17, page 45, and Table XIX, page 46, and the percentages of all suicidal deaths by type are indicated in Table XIX, page 46. Of the individuals dying by suicide who were tested for alcohol and drugs (i.e. in the hospital less than 24 hours), less than 50%, on the average, had positive blood tests for alcohol and/or drugs.

### Abuse Drug Involvement (Table XX, page 46)

Heroin (measured as morphine) was the most frequently used abuse drug in all suicidal deaths in general and, specifically, in those deaths caused by drug overdoses. Abuse drugs were associated more frequently with deaths caused by firearms (7 cases) than with any other mode of suicide except for drug overdose. Abuse drugs may have played a role in suicidal deaths by hanging (3 cases) and by jumping (4 cases).

### Racial Distribution (Table XXI and Figure 18, page 47)

Deaths from suicide occurred most frequently in whites (79% of total suicides). This was also true for all modes of suicide separately. The white racial group has been divided into Hispanic and non-Hispanic in the tabulation. It can be seen that the white Hispanic group was involved in only 5% of all suicides but in 33% of all suicides by jumping from buildings while white non-Hispanics, who were involved in 74% of all suicides, were only involved in 40% of suicides by cutting/stabbing. The mode of asphyxia/suffocation was used more frequently by Asians (29%) than would have been expected by the overall percentage of suicides by Asians (11%).

### Age Distribution (Table XXII, p. 48, Table XXIII, p. 49 and Figure 19, p. 49)

There were no deaths by suicide in the 0-12 year age group during this fiscal year. There were 3 suicides in the 13-19 year age group which represents a 50% decrease from the previous fiscal year. There was more than a doubling of the number of suicides in the 80-89 year age group (from 5 to 12 such deaths) as compared to the previous fiscal year. The 30-39 year age group has the highest percentage of suicides of any age group with deaths from drug overdoses and jumping from the Golden Gate Bridge being particular prevalent in this age group. Asphyxiation appears to be a mode of suicide used predominantly by older adults with 71% of the deaths by asphyxiation being in the 70+ age group. Deaths by drug overdose, jumps from buildings, and firearms are generally spread over all age groups.

### Distribution by Sex (Table XXIV, page 50)

Males were more likely than females to commit suicide in 1988-89 (70% male, 30% female).

## SUICIDES

Suicides are self-inflicted deaths. In San Francisco, 171 suicides occurred, accounting for 10% of the Medical Examiner death investigations for the fiscal year of 1988-89.

### SUICIDE METHODS IN FY 1988-89

#### TYPES OF DEATHS

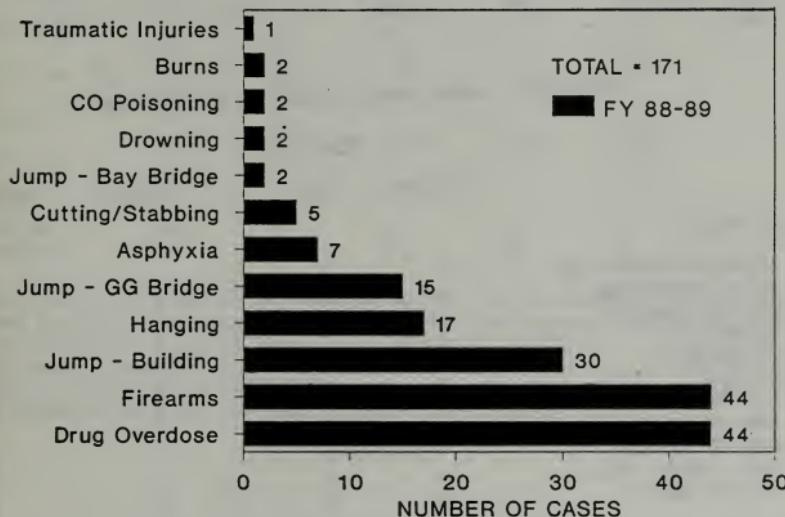


Figure 17.

TABLE XIX. SUICIDAL DEATHS BY MODEDrug and Alcohol Involvement

METHOD	NUMBER	% OF TOTAL SUICIDES	% WITH ALCOHOL	AVE. ALC. CONC.(g%)	% WITH DRUGS
ASPHYXIA/SUFFOCATION	7	4.1	0	-	43
CO POISONING	2	1.2	0	-	0
CUTTING/STABBING	5	2.9	20	0.06%	40
DROWNING	2	1.2	0	-	50
FIREARMS	44	25.7	35	0.18%	27
HANGING	17	9.9	24	0.16%	41
JUMP-BAY BRIDGE	2	1.2	50	0.04%	0
JUMP-BUILDING	30	17.5	50	0.14%	11
JUMP-GG BRIDGE	15	8.8	20	0.21%	14
MULT. TRAUM. INJ.	1	0.5	0	-	0
DRUG OVERDOSE	44	25.7	22	0.21%	-
BURNS	2	1.2	0	-	50

TABLE XX. ABUSE DRUGS PRESENT IN SUICIDAL DEATHS

Drugs

Situation	Cocaine	PCP	Morphine	Amphetamines
ASPHYXIA/SUFFOCATION	0	0	1	0
AUTO/CO POISONING	0	0	0	0
CUTTING/STABBING	0	0	0	0
DROWNING	0	0	1	0
FIREARMS	5	0	2	0
HANGING	2	1	0	0
JUMP-BAY BRIDGE	0	0	0	0
JUMP-BUILDING	0	0	3	0
JUMP-GG BRIDGE	0	1	0	0
MULT. TRAUM. INJ.	0	0	0	0
DRUG OVERDOSE	0	0	8	0
TOTALS	7	2	15	0

TABLE XXI. SUICIDE METHODS BY RACE

Method	Race					Total	
	W-NH	W-H	B-NH	Asian	Other		
Asphyxia/Suffoc.	5 (71%)	0	0	(29%)	2	0	7
CO Poisoning	2 (100%)	0	0	0	0	0	2
Cutting/Stabbing	2 (40%)	0	0	(40%)	1	(20%)	5
Drowning	1 (50%)	1 (50%)	0	0	0	0	2
Firearms	35 (80%)	1 (2%)	(5%)	(7%)	3	(7%)	44
Hanging	11 (65%)	2 (12%)	0	(18%)	3	1 (6%)	17
Jump-Bay Brdg	2 (100%)	0	0	0	0	0	2
Jump-Building	20 (67%)	1 (3%)	(10%)	(17%)	5	1 (3%)	30
Jump-GG Brdg	11 (73%)	1 (7%)	(7%)	(7%)	1	1 (7%)	15
Mult. Traum. Inj.	1 (100%)	0	0	0	0	0	1
Drug O.D.	35 (80%)	2 (5%)	(5%)	(7%)	3	2 (5%)	44
Burns	1 (50%)	0	1 (50%)	0	0	0	2
TOTALS (NO.)	126	8	9	19	9	171	
% OF TOTALS	74%	5%	5%	11%	5%		

\* Row percentages refer to percentages by race for each method. These can be compared to total percentages for each race to see whether a method is more or less prevalent in a racial group. For instance, suicides by stabbing appear to occur more frequently in Asians (40%) than the general involvement of Asians in suicides (11%), while deaths by stabbing in white/non-Hispanics (40%) occur less frequently than all suicides in white/non-Hispanics (74%).

RACE OF SUICIDE VICTIMS  
FY 1988-89

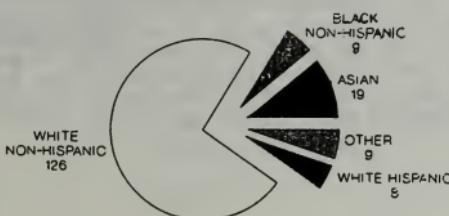


Figure 18.

TABLE XXII. SUICIDE METHODS BY AGE

Method	<u>Age</u>									
	13-16	17-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Asphyxia/Suffoc.	0	0	0	0	1 (14%)	1 (14%)	0	3 (43%)	2 (29%)	0
Burns	0	0	2 (100%)	0	0	0	0	0	0	0
CO Poisoning	0	0	0 (50%)	1	0	0	1 (50%)	0	0	0
Cutting/Stabbing	0	0	0	0	1 (20%)	3 (60%)	1 (20%)	0	0	0
Drowning	0	0	0	0	1 (50%)	1 (50%)	0	0	0	0
Firearms	0	1 (2%)	8 (18%)	5 (11%)	7 (16%)	6 (14%)	7 (16%)	6 (14%)	1 (2%)	3 (7%)
Hanging	1 (6%)	0	5 (29%)	4 (24%)	3 (18%)	0	4 (24%)	0	0	0
Jump-Bay Bridge	0	0	1 (50%)	0	0	1 (50%)	0	0	0	0
Jump-Building	0	0	3 (10%)	5 (17%)	4 (13%)	1 (3%)	3 (10%)	9 (30%)	5 (17%)	0
Jump-GG Bridge	0	0	4 (27%)	10 (67%)	1 (7%)	0	0	0	0	0
Mult. Traum. Inj.	0	0	1 (100%)	0	0	0	0	0	0	0
Drug Overdose	0	1 (2%)	6 (17%)	8 (18%)	10 (23%)	10 (23%)	3 (7%)	3 (7%)	3 (7%)	0
TOTAL NO.	1	2	30	33	28	23	19	21	11	3
% OF TOTAL	.5%	1%	18%	19%	16%	13%	11%	12%	6%	2%

\* Row percents refer to percentage by age range for each method. These can be compared to total percentages for each age range to see if a method is more or less prevalent in an age group. For example, jumping from the Golden Gate Bridge appears to occur more frequently in the 30-39 years of age group (67%) than the general involvement of this age group in suicides (19%) while deaths from firearms in the 30-39 year age group (11%) occur less frequently than all suicides in this age group (19%). Also, it should be noted that 18% of all suicides occur in the 70-89 year age group but 47% of deaths by jumping from buildings and 72% of deaths by suffocation occur in this age group.

## SUICIDES

TABLE XXIII. AGE RANGES - COMPARISON BY YEAR

<u>Age Range</u>	<u>'81-'82</u>	<u>'82-'83</u>	<u>'83-'84</u>	<u>'84-'85</u>	<u>'85-'86</u>	<u>'86-'87</u>	<u>'87-'88</u>	<u>'88-'89</u>
0 - 19	7	9	4	7	7	2	6	3
20 - 29	56	37	34	27	29	22	36	30
30 - 39	48	48	44	37	46	45	28	33
40 - 49	26	20	21	25	18	28	24	28
50 - 59	13	20	26	20	18	30	23	22
60 - 69	17	17	20	21	19	20	19	19
70 - 79	12	18	18	15	12	12	17	21
80 - 89	3	9	12	4	10	9	5	11
90 - 99	1	2	3	2	2	3	4	3
Unknown	0	0	0	0	0	0	0	1

## SUICIDE VICTIMS BY AGE FY 1988-89



Figure 19.

TABLE XXIV. SUICIDE METHODS BY SEX

Method	<u>Sex</u>	
	<u>Male</u>	<u>Female</u>
Asphyxia/Suffocation	4 ( 57%)	3 ( 43%)
Burns	0 ( 0%)	2 (100%)
CO Poisoning	2 (100%)	0 ( 0%)
Cutting/Stabbing	3 ( 60%)	2 ( 40%)
Drowning	1 ( 50%)	1 ( 50%)
Firearms	36 ( 82%)	8 ( 18%)
Hanging	12 ( 71%)	5 ( 29%)
Jump-Bay Bridge	1 ( 50%)	1 ( 50%)
Jump-Building	21 ( 70%)	9 ( 30%)
Jump-GG Bridge	13 ( 87%)	2 ( 13%)
Mult. Traum. Inj.	1 (100%)	0 ( 0%)
Drug Overdose	25 ( 57%)	19 ( 43%)
TOTALS	119 (70%)	52 (30%)

\* Row percents refer to percentages by sex for each mode. These can be compared to total percentages for each sex to see whether a mode is more or less prevalent in one sex. For example, deaths by firearms appear to occur more frequently in males (82%) than the general involvement of males in suicides (70%), while females jump to their deaths from the Golden Gate Bridge less frequently (13%) than all suicides in females (30%).

## HOMICIDE

Homicide is the killing of one human being by another. Murder is the unlawful killing of a human being with malice. The following data do not differentiate homicide as to whether it was justifiable, accidental, or murder. Such distinctions are the proper function of the judicial system and are not the responsibility or function of this office.

Any judicial system which deals with crimes involving death requires a well-trained staff and well-equipped Medical Examiner-Coroner's Office which can and will interpret forensic findings in an unbiased, fair manner. Their investigation must be intense, accurate and rapid enough so that charges may be pursued or dismissed without unfairly affecting an individual's constitutional rights. This is the purpose of this office.

The proper evaluation and investigation of a homicide begins, naturally, at the scene. In the majority of cases, a staff member of this office (either the Investigator, Administrative Coroner, or Medical Examiner), determines whether a death is potentially a homicide. It has been well-documented that, if such a determination is made by an individual inexperienced or untrained in death investigation, his opinion will be wrong in 50% of the cases. Such a person is very apt to miss the subtle homicide and is more inclined to miscall a natural or accidental death as homicide, resulting in false arrest, false accusations, needless expenditure of public funds, waste of investigative time and delay in the investigation of other deaths.

The Investigator responds to the scene of death and determines whether the Police Homicide Detail will be called. When homicide is obvious, the Investigator responds as part of a team (other members include homicide investigators, photographers and criminologists). This office is responsible for the body, identification, inquiry into circumstances, manner and means of death (Gov. Code 27491.2). In addition to the scene investigation, the Investigator is responsible for recovering property, locating and notifying next of kin, and preparing a written summary of his investigation.

In about one-third to one-half of all homicides, a forensic pathologist will respond to the scene and aid in the investigation. The subsequent autopsy may also use photography, fluoroscopy, X-ray, angiography and other techniques to establish and define the number, nature and severity of wounds, to obtain evidence (i.e. bullets) and to prepare an official report. This report, including chemistry, serology and toxicology results, is used as part of the prosecution or defense of the case in the formal judicial hearing.

Pertaining to criminal trial, our judicial system requires identification of an individual and presentation of evidence, usually by virtue of expert testimony, relative to the cause of death or trauma associated with death. The Medical Examiner-Coroner's Office identifies the body, frequently relying on local police, CII, or FBI fingerprints. Expert forensic testimony is given by

the Forensic Pathologist from this office. In addition, the Forensic Toxicologist is frequently called upon to testify on the significance and effect of various drug levels, a matter of great importance when dealing with the concept of diminished capacity.

Of minor, but increasing importance, is the fact we are seeing more homicide and trauma cases transferred into the County for medical therapy because of San Francisco's excellent and advanced medical facilities. Should these individuals die, the autopsy and court testimony are done by this office.

## HOMICIDE DEATHS

One hundred and seven deaths were ruled to have been due to homicide during the 1988-89 fiscal year. The number of individuals dying by each manner of death by homicide are indicated in Figure 20, page 54 and Table XXV, page 55, and the percentage of all homicides represented by specific method used are indicated in Table XXV, page 55. Of the homicide victims tested for alcohol and drugs (those in the hospital for less than 24 hours), a large percentage had positive blood alcohol levels as well as having drugs present. The percent of homicide victims with positive blood tests for drugs varied with the method of homicide with 60% of those dying of asphyxia and 1/3 of those dying from stabbing having drugs present.

### Abuse Drug Involvement (Table XXVI, page 55)

Cocaine was the abuse drug seen most frequently in homicide victims. It was found in 25 homicide cases or 27% (25/91) of all non-vehicular homicides. Cocaine was associated most strongly with deaths by gunshot wound, with 17 of the 25 cases with cocaine present (68%) being deaths due to gunshot wound. Heroin was the second most frequently found abuse drug and was also strongly associated with deaths due to gunshot wound with 3 of 4 cases with heroin present being due to gunshot wound. Stabbing was the homicide method which was associated with drugs next most frequently to gunshot wound. Cocaine was present in 5 cases and heroin was present in 1 case who died by stabbing. The number of homicide deaths in which amphetamines was present decreased from 6 in fiscal year 1987-88 to 2 in fiscal year 1988-89.

### Racial Distribution (Table XXVII and Figure 21, page 56)

Overall, deaths by homicide occurred most frequently in blacks (40%) followed closely in frequency by whites (36%). This is the reverse of the situation in the previous fiscal year when 43% of homicides occurred in whites and 37% of homicides occurred in blacks. Deaths by firearms occurred with a greater frequency in blacks (59%) than in either whites (17%) or Asians (12%). Vehicular deaths occurred more frequently in whites and much less frequently in blacks than would be predicted based on the percentages of these racial groups involved in all types of homicides.

### Age Distribution (Figure 22, page 57, and Tables XVIII and XXIX, page 58)

There were 18 homicides in the 0-19 year age group. Two-thirds (67%) of these homicides were due to firearms. All deaths by firearms occurred in age groups of less than 59 years with a peak occurrence in the 20-29 year age group. The peak occurrence of stabbing deaths was also in the 20-29 year age group. There were 6 homicides in individuals over the age of 60 during 1988-89 as compared to 13 in this age group during the previous fiscal year, a decrease of more than 50%.

### Distribution by Sex (Table XXX, page 59)

Males were nearly four times as likely to be homicide victims as females. This male predominance was even more pronounced for deaths by stabbing where 90% of the homicide victims were male.

## NON-VEHICULAR HOMICIDES

Homicides are those deaths caused by another person, generally resulting in murder and manslaughter charges. In San Francisco, 91 non-vehicular homicides occurred in 1988-89, accounting for 5% of the total Medical Examiner investigations.

## HOMICIDE METHODS IN FY 1988-89

### TYPES OF DEATHS

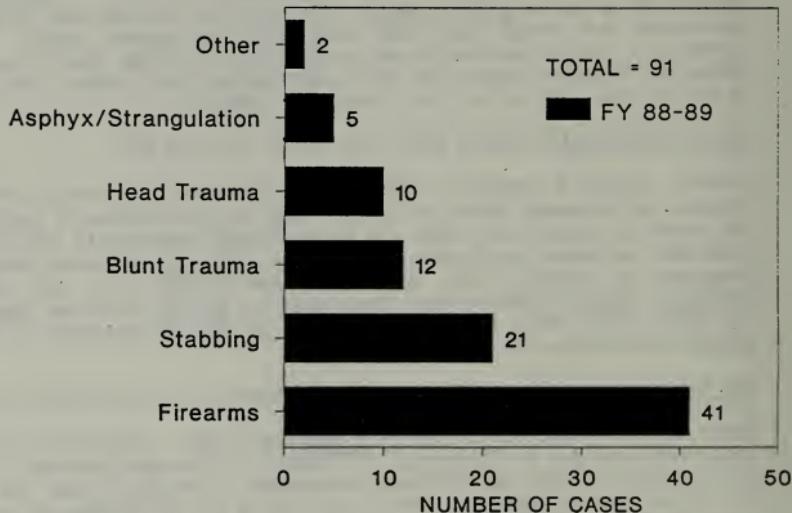


Figure 20.

TABLE XXV. HOMICIDAL DEATHS BY MODEDrug and Alcohol Involvement

<u>METHOD</u>	<u>NUMBER</u>	<u>% OF TOTAL HOMICIDES</u>	<u>% WITH ALCOHOL*</u>	<u>AVE. ALC. CONC.(g%)</u>	<u>% WITH DRUGS**</u>
ASPHYXIA/ STRANGULATION	5	5	60	0.16%	60
STABBING	21	20	50	0.16%	32
HEAD TRAUMA	10	9	43	0.21%	17
FIREARMS	41	38	41	0.12%	46
BLUNT TRAUMA	12	11	45	0.25%	27
VEHICULAR	16	15	13	0.14%	14
OTHER	2	2	0	-	50

\* Refers to percentage of victims (of those tested) with positive blood ethyl alcohol concentrations

\*\* Refers to percentage of victims (of those tested) with positive blood tests for abuse drugs.

TABLE XXVI. DRUGS PRESENT IN NON-VEHICULAR HOMICIDAL DEATHSDrugs

<u>Situation</u>	<u>Cocaine</u>	<u>PCP</u>	<u>Heroin</u>	<u>Amphetamines</u>
ASPHYXIA/STRANGULATION	1	0	0	0
MULTIPLE TRAUM. INJURIES	1	0	0	2
GUNSHOT WOUND	17	1	3	0
STABBING	5	0	1	0
OTHER	1	0	0	0
TOTALS	25	0	6	6

TABLE XVII. HOMICIDE METHODS BY RACE

Method	Race					Total
	W-NH	W-H	B-NH	Asian	Other	
Asphyxia/Strang.	3 (60%)	0	2 (40%)	0	0	5
Head Trauma	1 (10%)	2 (20%)	6 (60%)	0	1 (10%)	10
Vehicular	8 (50%)	1 (6%)	1 (6%)	4 (25%)	2 (13%)	16
Firearms	4 (10%)	3 (7%)	24 (59%)	5 (12%)	5 (12%)	41
Stabbing	8 (38%)	3 (14%)	5 (24%)	3 (14%)	2 (4%)	21
Blunt Trauma	5 (42%)	1 (8%)	4 (33%)	2 (17%)	0	12
Other	0	0	1 (50%)	1 (50%)	0	2
TOTALS	29	10	43	15	10	107
% OF TOTAL	27%	9%	40%	14%	9%	

\* Row percentages refer to percentages by race for each method. These can be compared to total percentages for each race to see whether a method is more or less prevalent in a racial group. For instance, death by asphyxia/ strangulation appears to occur more frequently in white/non-Hispanics (60%) than the general involvement of white/non-Hispanics in homicides (27%), while deaths due to stabbing appear to occur less frequently in black/non-Hispanics (24%) than all homicides in black/non-Hispanics (40%).

#### RACE OF HOMICIDE VICTIMS FY 1988-89

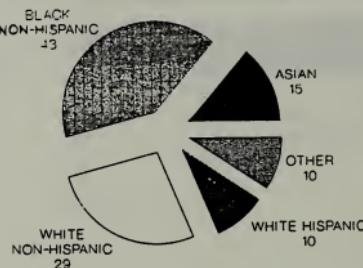


Figure 21.

### HOMICIDE VICTIMS BY AGE FY 1988-89

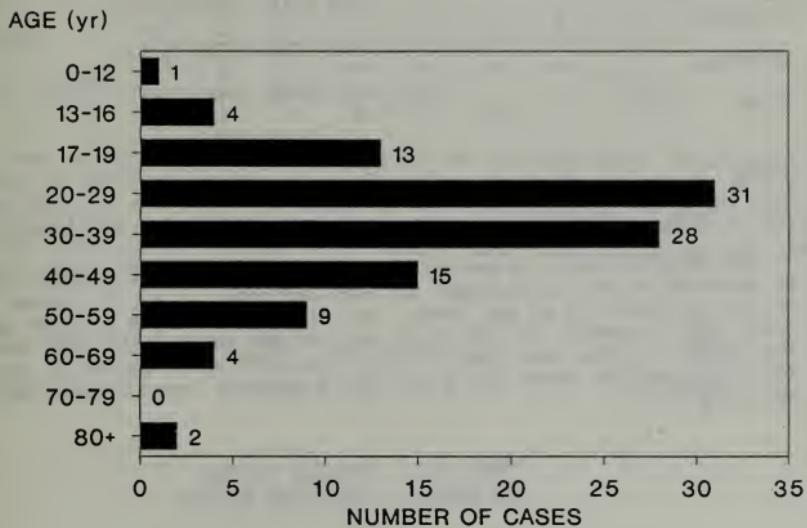


Figure 22.

TABLE XVIII. HOMICIDE METHODS BY AGEAge

	<u>0-12</u>	<u>13-16</u>	<u>17-19</u>	<u>20-29</u>	<u>30-39</u>	<u>40-49</u>	<u>50-59</u>	<u>60-69</u>	<u>70-79</u>	<u>80+</u>
<u>Method</u>										
Asphyxia/Strang.	0	0	0	0	3 (60%)	0	0	2 (40%)	0	0
Head Trauma	0	0	0	0	4 (40%)	4 (40%)	0	2 (20%)	0	0
Firearms	0	3 (7%)	9 (22%)	18 (44%)	7 (17%)	2 (5%)	2 (5%)	0	0	0
Blunt Trauma	0	0	0	2	4 (17%)	3 (33%)	2 (25%)	0	0	1 (8%)
Vehicular	1 (6%)	1 (6%)	2 (12%)	3 (19%)	4 (25%)	2 (12%)	2 (12%)	0	0	1 (8%)
Stabbing	0	0	2 (10%)	8 (38%)	5 (24%)	3 (14%)	3 (14%)	0	0	0
Other	0	0	0	0	1 (50%)	1 (50%)	0	0	0	0
TOTALS	1	4	13	31	28	15	9	4	0	2
% OF TOTALS	(1%)	(4%)	(12%)	(29%)	(26%)	(14%)	(8%)	(4%)	(0%)	(2%)

\* Row percents refer to percentage by age range for each method. These can be compared to total percentages for each age range to see if a method is more or less prevalent in an age group. For example, deaths by firearms appear to occur more frequently in the 20-29 years of age group (44%) than the general involvement of this age group in homicides (29%) while deaths by firearms in the 40-49 year age group (5%) occur less frequently than all homicides in this age group (14%).

TABLE XXIX. HOMICIDE VICTIMS  
AGE RANGES - COMPARISON BY YEAR

<u>Age range</u>	<u>YEAR</u>								
	<u>'81-'82</u>	<u>'82-'83</u>	<u>'83-'84</u>	<u>'84-'85</u>	<u>'85-'86</u>	<u>'86-'87</u>	<u>'87-'88</u>	<u>'88-'89</u>	
0 - 19	16	7	8	8	9	8	16	18	
20 - 29	33	26	21	30	40	28	28	31	
30 - 39	36	30	27	22	27	27	41	28	
40 - 49	18	16	16	10	18	18	12	15	
50 - 59	16	16	4	10	7	11	13	9	
60 - 69	6	6	6	5	4	8	8	4	
70 and above	7	2	3	10	15	10	5	2	

TABLE XXX. HOMICIDE METHODS BY SEX

<u>Method</u>	<u>Sex</u>	
	<u>Male</u>	<u>Female</u>
Asphyxia/Strangulation	4 ( 80%)	1 ( 20%)
Head Trauma	8 ( 80%)	2 ( 20%)
Firearms	35 ( 85%)	6 ( 15%)
Mult. Traum. Inj.	9 ( 75%)	3 ( 25%)
Vehicular	9 ( 56%)	7 ( 43%)
Stabbing	19 ( 90%)	2 ( 10%)
Other	1 ( 50%)	1 ( 50%)
TOTALS	85	22
% OF TOTALS	(79%)	(21%)

\* Row percents refer to percentages by sex for each mode. These can be compared to total percentages for each sex to see whether a mode is more or less prevalent in one sex. For example, deaths by stabbing appear to occur more frequently in males (90%) than the general involvement of males in homicides (79%), while deaths by stabbing in females (10%) occur less frequently than all homicides in females (21%).



## PATHOLOGY

In the Pathology Department, tissue and body fluid samples taken at autopsy are prepared for microscopic study, histochemically stained, or analyzed for chemical constituents. Cardiac pacemakers or other mechanical life-support devices are examined for any defect. Smears or "wet-mounts" are examined for spermatozoa, bacteria, or tuberculosis. Bacteriologic cultures may be taken. However, if pathogens are grown, they are usually sent to the Department of Public Health (State or local) for further identification. If indicated, "soft" X-rays or histochemical tests are done to establish entrance or exit gunshot wounds. New research techniques, such as methods of obtaining fingerprints from the skin of a victim, are developed here also.

MONTHLY FIGURES

1988-1989

PATHOLOGY\*

YEAR	TOTAL MED-EXAM CASES	CASES REFERRED TO PATHOLOGIST	NO. OF ORGANS SUBMITTED	NO. OF SECTIONS TAKEN	HISTO PATHOLOGIC SLIDES MADE	SPECIAL STAINS **	BLOOD GROUPINGS ***	OTHER DETERMINA- TIONS ****
<b>1988</b>								
JUL	133	100	527	1222	474	191	28	318
AUG	133	115	402	837	327	132	30	333
SEP	128	97	664	1378	547	119	24	233
OCT	130	106	551	1171	499	95	18	308
NOV	141	108	734	1442	636	98	20	339
DEC	151	101	507	1060	447	151	20	367
<b>1989</b>								
JAN	160	117	641	1312	581	215	22	401
FEB	154	112	681	1499	696	193	22	364
MAR	162	117	430	912	434	203	23	228
APR	141	94	523	1117	476	213	12	249
MAY	119	85	452	991	391	113	20	212
JUN	134	95	341	808	390	122	22	405
TOTALS	1686	1247	6453	13749	5898	1845	261	3757

\* These figures do not reflect photography, forensic radiology, or material prepared for teaching forensic pathology  
 \*\* Includes smears examined for bacteria and spermatozoa  
 \*\*\* ABO and Anti-Rh  
 \*\*\*\* Blood, urine, water, evidence for: hematology, biochemistry, urinalysis, bacteriology, serology, "Sickledix," etc.

## TOXICOLOGY

Toxicology is the study of the interaction of foreign compounds, such as drugs, with living organisms (e.g. people). It involves knowing something of the nature of that interaction, how the foreign compounds break down (that is, how they are metabolized), and what effects they have on the health and behavior of the organism.

All of this information is vital to the role that toxicology plays in determining the cause of death, as well as in evaluating the significance of chemicals found in the living.

Generated within the Toxicology Department is information on samples from Medical Examiner's cases as well as from suspects in criminal cases (e.g.. homicides, driving under the influence, probation failure, (H & S 11550), assaults) and other persons to be tested at the request of various law enforcement agencies. The data obtained in these cases enable the toxicologist to assist in interpreting the behavior of the suspects involved, to advise the District Attorney, the Public Defender, the City Attorney, Police Department, the California Highway Patrol, and other agencies, and to give expert testimony in court as necessary in such cases as to the effect of drugs in the case. This application of toxicological facts to legal problems is Forensic Toxicology.

The Toxicology Department also performs analyses on samples submitted by the Police and Fire Departments in connection with the recruitment programs and other personnel requirements. The results in some cases are presented to the respective commission in official hearings.

Toxicological facts are determined through tests performed on biological samples (e.g. blood, urine, gastric contents, liver, etc.) taken at the time of autopsy or from living persons. The samples are subjected to a series of chemical manipulations designed to extract any drugs or other physiologically active compounds that may be present. The subsequent extracts are then examined by equipment set up to detect, accurately identify, and quantitate any materials that may be present. These determinations must be of unquestionable accuracy and as specific as scientifically possible; and they must be able to stand up to review by any other qualified laboratory in the nation.

The analytical methods most commonly used in the toxicological studies are gas and thin layer chromatography; ultraviolet, visible, and fluorescence spectrophotometry; and immunoassay techniques. Advanced techniques, such as mass spectrometry and HPLC (High Performance Liquid Chromatography) are used as necessary for confirmation of difficult samples. These precise and sophisticated methods require the use of advanced laboratory apparatus and highly trained personnel.

Toxicology, Continued

Levels of drugs in two or more body compartments (one of which is invariably blood) are routinely determined in order to answer the question of whether the drug use is acute or chronic. This approach is of the utmost importance in determining the time of ingestion and whether or not the intent of the ingestion was suicide.

The range of drugs available to the public is extremely wide, and the nature and type of compounds involved are highly variable. The methodologies necessary to conduct toxicological analyses have to be similarly wide-ranging and also continually expanded in order to keep up with the manufacture of new drugs, both legal and illegal. This is an important aspect of the Toxicology Department's work, often requiring extensive research. So, too, does the identification of "street-manufactured" compounds which are sometimes found in post-mortem samples. Also, with many drugs being compounded to have physiologic effects at very low doses, detection in body fluids is often extremely difficult.

The most common drugs in the community are alcohol and prescription items. However, illegal, or "street", drugs (especially morphine-type alkaloids [e.g. heroin], cocaine, and amphetamines) represent a very significant percentage of the compounds actually found in the cases presented to the Toxicology Department. Less commonly used drugs, industrial materials, certain gases, and various other foreign compounds have also been detected.

There was an increase of 154% in the number of cases referred to the Toxicology Department, which resulted in a 133% increase in the number of toxicological tests performed. These astonishing increases in work load reflect the increasing concerns of the community with respect to drug use, and they have contributed to the fact that forensic toxicology continues to be one of the fastest growing sections in the Medical Examiner's Office.

TOXICOLOGY  
MEDICAL EXAMINER - CORONER'S CASES

SAN FRANCISCO CITY AND COUNTY  
 July 1988 - June 1989

Incidence of drugs and other physiologically active material detected

The compounds listed are not necessarily the cause of death nor even a contributing factor. They are the toxic agents that were found to be present, either singly or in combination, in Medical Examiner's cases.

ABUSE DRUGS

Morphine-type alkaloids	149
Cocaine	110
Benzoylecgonine	117*
Codeine	72
Methamphetamine	27
Amphetamine	26
Phencyclidine (PCP)	5

ANTI-DEPRESSANTS

Amitriptyline (Elavil)	24
Nortriptyline (Aventyl)	17
Imipramine (Tofranil)	11
Desipramine (Norpramin)	4
Doxepin (Sinequan)	6
Maprotiline	1
Trazodone	1

\*Benzoylecgonine is not a drug of abuse. It is a metabolite of cocaine and is always present when cocaine is detected. In some cases, benzoylecgonine, but not cocaine, was found which indicated that there had been some exposure to cocaine.

ANALGESICS - NARCOTIC

Methadone	19
Methadone Metabolite	7
Propoxyphene (Darvon)	3
Norpropoxyphene	3
Meperidine	3
Oxycodone	1
Fentanyl	1
Alfentanil	1

SEDATIVE-HYPNOTICS

Barbiturates

Phenobarbital	7
Secobarbital	3
Pentobarbital	6
Bromoobarbital	1

ANALGESICS - NON-NARCOTIC

Salicylates	27
Acetaminophen	11

CARDIAC DRUGS

Lidocaine	78
-----------	----

ANTI-ANXIETY AGENTS

Diazepam (Valium)	8
Nordiazepam	8
Triazolam (Halcion)	7
Chlordiazepoxide (Librium)	1
Alprazolam (Xanax)	3
Lorazepam (Ativan)	1
Flurazepam (Dalmane)	5
N-Desalkylflurazepam	6

ANTIHISTAMINES

Diphenhydramine	4
Chlorpheniramine	2
Promethazine	2

BRONCHODILATORS

Theophylline	8
Ephedrine	16

Drugs Detected, Continued

ANTICONVULSANTS

Diphenylhydantoin (Dilantin) 12  
Carbamazepine (Tegretol) 3

ANTITUSSIVES

Dextromethorphan 3

ANTIPSYCHOTIC AGENTS

Thioridazine 4  
Perphenazine 1  
Lithium 1

ANTIDIABETIC AGENTS

Insulin 2

DECONGESTANTS

Phenylpropanolamine 3

MISCELLANEOUS

Carbon Monoxide 13  
Cyanide 4  
Acetone 4  
Methemoglobin 1

ANTIMALARIALS

Pyrimethamine 1

CARDIAC GLYCOSIDES

Digoxin 1

ANESTHETICS - LOCAL

Bupivacaine 1

TOXICOLOGYMEDICAL EXAMINER - CORONER'S CASESSAN FRANCISCO COUNTY  
July 1988 - June 1989

<u>Year/ Month</u>	<u>No. of Cases Referred to Toxicology</u>	<u>No. of Specimens Received</u>	<u>No. of Tests Performed</u>	<u>Alcohol Tested</u>	<u>Pos.</u>	<u>% Pos.</u>
<u>1988</u>						
JUL	134	1,029	973	125	24	19.2
AUG	134	996	937	124	28	22.6
SEP	131	985	860	114	21	18.4
OCT	129	1,016	1,106	123	22	17.9
NOV	140	1,052	923	128	21	16.4
DEC	149	1,140	1,132	130	29	22.3
<u>1989</u>						
JAN	162	1,186	981	153	35	22.9
FEB	152	1,171	1,102	142	24	16.9
MAR	166	1,228	1,166	152	37	24.3
APR	132	985	842	114	22	19.3
MAY	124	993	1,017	105	26	24.8
JUN	138	1,083	1,079	119	29	24.4
<hr/> TOTAL	1,691	12,864	12,118	1,529	318	20.8

TOXICOLOGY

MEDICAL EXAMINER - CORONER'S CASES  
FROM OUTSIDE SAN FRANCISCO COUNTY  
July 1988 - June 1989

<u>Year/ Month</u>	<u>No. of Cases</u>	<u>No. of Specimens Received</u>	<u>No. of Tests Performed</u>	<u>Alcohol Tested</u>	<u>Pos.</u>	<u>% Pos.</u>
<u>1988</u>						
JUL	2	9	8	1	0	0.0
AUG	1	5	15	1	1	100.0
SEP	0	-	-	-	-	-
OCT	0	-	-	-	-	-
NOV	0	-	-	-	-	-
DEC	1	6	13	1	1	100.0
<u>1989</u>						
JAN	1	1	3	1	0	0.0
FEB	0	-	-	-	-	-
MAR	0	-	-	-	-	-
APR	8	48	70	8	0	0.0
MAY	0	-	-	-	-	-
JUN	0	-	-	-	-	-
<hr/> TOTAL	13	69	109	12	2	16.7

TOXICOLOGY

FORENSIC TOXICOLOGY CASES  
JULY 1988 - JUNE 1989

Cases in which specimens were referred to the Medical Examiner's Toxicology Laboratory for forensic toxicological examination generally were criminal cases in which the presence of drugs was suspected either in the victim or suspect of the crime. Testing of 11550, probation, DUI, management control and other miscellaneous cases is included in this tabulation.

YEAR/MONTH	No. Cases Referred to <u>Toxicology</u>	No. of Specimens Received	No. Of Tests Performed
1988			
JUL	456	547	2,612
AUG	425	547	2,393
SEP	449	579	2,535
OCT	473	609	2,703
NOV	539	661	3,128
DEC	628	764	3,471
1989			
JAN	629	748	3,435
FEB	587	703	3,248
MAR	690	819	3,767
APR	629	808	3,534
MAY	628	728	3,551
JUN	534	671	2,924
TOTAL	6,667	8,184	37,301

TOXICOLOGY

FORENSIC TOXICOLOGY CASES  
JULY 1988 - JUNE 1989

Incidence of drugs detected in all cases submitted to the Medical Examiner -  
Coroner's Office Toxicology Laboratory for forensic toxicological examination.

The samples in which these compounds were found to be present, either singly or in combination, were generally obtained from either suspects or victims in criminal cases, probationers or via management control investigations.

TYPE OF CASE

<u>Drug</u>	<u>11550</u>	<u>DUI</u>	<u>Probation</u>	<u>Other*</u>
Ethyl alcohol	1	284	0	22
Cocaine	269	69	787	12
Benzoylecgonine	273	71	1238	14
Phencyclidine (PCP)	135	23	102	0
Tetrahydrocannabinol	0	0	317	0
Morphine-type alkaloids	232	14	76	1
Methamphetamine	50	21	119	5
Amphetamine	49	19	107	5
Methadone	6	5	0	1
Methadone metabolite	2	3	0	0
Ephedrine	0	3	2	5
Diazepam	0	0	0	1
Nordiazepam	0	0	0	1
Diphenylhydantoin	0	1	0	0
Methaqualone	0	8	0	0
Codeine	42	11	23	1
Phenylpropanolamine	0	0	0	2
Propoxyphene	0	0	0	1
Norpropoxyphene	0	0	0	1
Triazolam	0	0	0	3
Hydroxymorphone	0	0	0	1
Nifedipine	0	0	0	1

\* "Other" includes testing of homicide suspects, Police and Fire Department recruits, management controls, out-of-county cases, and other miscellaneous cases.

## ABUSE DRUGS

The role of abuse drugs in deaths during the 1988-89 fiscal year is presented in this section. The four abuse drugs most commonly seen in Medical Examiner's cases - cocaine, heroin, amphetamines and PCP - will be examined. The number of cases in which these drugs were found either alone or in combination with other abuse drugs are presented in Table XXXI, page 73. Cocaine was the most frequently observed drug of abuse where drugs were present alone while heroin was the most frequently observed drug when drugs were present in combination.

### Distribution by Sex (Table XXXII, page 74 and Figures 23 and 24, page 75)

In deaths caused by abuse drugs (DC) or deaths related to abuse drugs (DR), where the drugs were present either singly or in combination, 50-100% of the deceased individuals were males.

### Distribution by Race (Table XXXII, page 74)

White/Non-Hispanic (W-NH) - In drug-caused deaths where abuse drugs were present either singly or in combination with other abuse drugs, the white non-Hispanic racial group predominated in deaths caused by heroin and amphetamines.

Black/Non-Hispanic (B-NH) - In drug-caused and drug-related deaths where abuse drugs were present singly, the black non-Hispanic racial group predominated in deaths where cocaine was present. This racial group was only minimally represented in drug-caused deaths where heroin alone was present (19%).

White/Hispanic (W-H) - This racial group was most heavily represented in deaths where PCP was present, either alone or in combination with other drugs.

### Distribution by Age (Table XXXII, page 74 and Figures 25 and 26, page 76)

In deaths where abuse drugs were present singly, there were some notable differences in mean ages of the victims. Users of PCP (drug-related deaths only) were of a considerably younger mean age (24.5 years) as compared to the mean ages of users of cocaine (drug-caused, 37.4 years) and heroin (38.5 years). The mean age of amphetamine users whose deaths were caused by drugs decreased considerably from the 1987-88 mean of 42.3 years to 30.8 years in 1988-89. In deaths where abuse drugs were present in combination, the mean ages of users of cocaine, heroin and amphetamines were more homogeneous than in deaths where drugs were present singly, but the mean age of victims with PCP present was still considerably lower (24.0 years).

### Alcohol Involvement (Table XXXII, page 74)

The presence of alcohol in the blood of abuse drugs users was most often associated with deaths caused by heroin alone (76%) and was least associated with deaths due to amphetamines alone.

### Deaths Involving Cocaine (Tables XXXIII and XXXIV, p. 77 and Figure 27, p. 78)

Cocaine alone was the cause of death in 22 cases by overdose, a slight decrease from the previous fiscal year (28 cases). Cocaine alone was also present in 34 non-drug caused deaths (See Table XXXIII) including 5 ruled to be accident, 5 ruled to be suicide and 21 ruled to be homicide. Notably, 22 of these 34 deaths (65%) were due to gunshot or stabbing.

Cocaine in combination with other drugs was the cause of death in 36 cases by overdose. Cocaine in combination was also present in 11 non-drug caused deaths (See Table XXXIV) including 4 cases ruled to be homicides. Of these 11 deaths, 5 (45%) were by gunshot or stabbing.

The number of deaths due to cocaine over the last 6 fiscal years is shown in Figure 27. It can be seen that the number of deaths due to cocaine has been rising steadily since 1985.

### Deaths Involving Heroin (Figure 28, page 78 and Table XXXV, page 79)

Heroin alone was the cause of death in 42 cases by overdose, more than double the number of cases of the preceding fiscal year (20). Heroin alone also was present in 2 non-drug caused deaths. The involvement of heroin alone in non-drug caused deaths was very minimal as compared to the involvement of cocaine in this type of death, both in number and means of death.

Heroin in combination with other drugs was the cause of death in 59 cases by overdose, a nearly 50% increase over the previous fiscal year. Heroin in combination was present in 12 non-drug caused deaths, 7 of which (58%) were due to gunshot or stabbing.

The numbers of deaths due to heroin over the last 18 fiscal years are shown in Figure 28, page 78. The number of such deaths for 1988-89 is the highest seen over this time period.

### Deaths Involving Amphetamines (Table XXXVI, page 80)

Amphetamines alone were the cause of death in 5 cases by overdose and were present in only 2 non-drug caused deaths, both homicides. It is notable that there were no homicide deaths by gunshot or stabbing in which amphetamines alone were present. This is in sharp contrast to the situation in the previous fiscal year when there were 6 times as many non-drug caused deaths with amphetamines alone present, and one-half of these deaths were due to stabbing.

Amphetamines in combination with other drugs were the cause of death in 13 cases by overdose. Amphetamines in combination with other drugs were present in only 1 non-drug caused death.

TABLE XXXI. ABUSE DRUGS  
SAN FRANCISCO MEDICAL EXAMINER-CORONER'S CASES

Abuse Drugs Present Alone

<u>Drug</u>	<u>Drug Caused Deaths</u>	<u>Drug Related Deaths</u>	<u>Role Unclear</u>	<u>Incidental Finding</u>
Cocaine alone	22	34	4	6
Heroin alone	42	2	3	7
Amphetamines alone	5	2	2	1
PCP alone	0	2	0	0

Abuse Drugs Present in Combination with Other Drugs

<u>Drug</u>	<u>Drug Caused Deaths</u>	<u>Drug Related Deaths</u>	<u>Role Unclear</u>	<u>Incidental Finding</u>
Cocaine in combination	36	11	2	3
Heroin in combination	59	12	4	3
Amphetamines in combin.	13	1	1	1
PCP in combination	2	1	0	0

TABLE XXXII. ABUSE DRUGS  
INCIDENCE BY SEX, RACE, AGE, AND ALCOHOL INVOLVEMENT

Drugs Present Singly

Drug	SEX		RACE			Mean Age	% WITH ALCOHOL	AVE. ALC. CONC (g%)
	%M	%F	%W-NH	%W-H	%B-NH			
COCAINE-DC*	64	36	27	14	50	37.4	27	0.23
COCAINE-DR**	76	24	15	9	56	29.6	53	0.11
HEROIN -DC*	86	14	64	7	19	38.5	76	0.22
HEROIN-DR**	50	50	0	0	50	56.5	50	0.12
AMPHET.-DC*	80	20	100	0	0	30.8	20	0.10
AMPHET.-DR**	50	50	50	50	0	28.0	0	-
PCP-DC*			NONE					
PCP-DR**	100	0	50	50	0	24.5	50	0.26

Drugs Present in Combination

Drug	SEX		RACE			Mean Age	% WITH ALCOHOL	AVE. ALC. CONC (g%)
	%M	%F	%W-NH	%W-H	%B-NH			
COCAINE+-DC*	81	19	47	11	25	34.8	30	0.13
COCAINE+-DR**	91	9	36	18	45	36.6	36	0.17
HEROIN+-DC*	68	32	58	5	17	38.7	36	0.15
HEROIN+-DR**	67	33	42	8	33	43.1	33	0.12
AMPHET+-DC*	92	8	77	0	8	35.8	46	0.12
AMPHET+-DR**	0	100	100	0	0	26.0	0	-
PCP+-DC*	100	0	50	50	0	24.0	50	0.19
PCP+-DR**	100	0	0	100	0	16.0	0	-

\* DC = Drug Caused

\*\* DR = Drug Related

# ABUSE DRUG DEATHS DRUG PRESENT ALONE

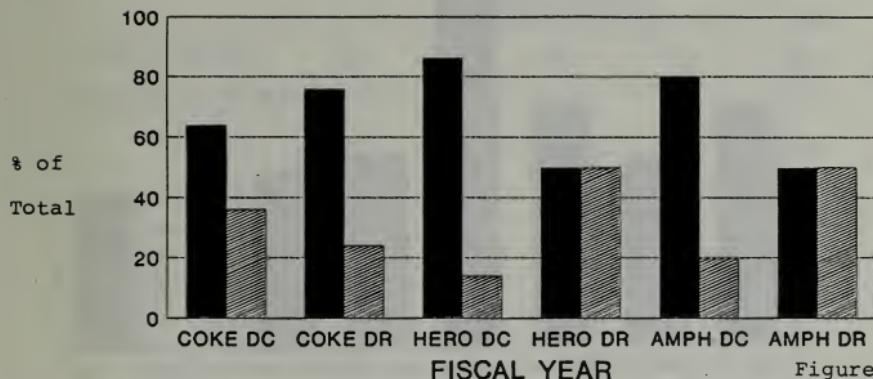


Figure 23.

## SEX DISTRIBUTION

# ABUSE DRUG DEATHS DRUG PRESENT IN COMBINATION

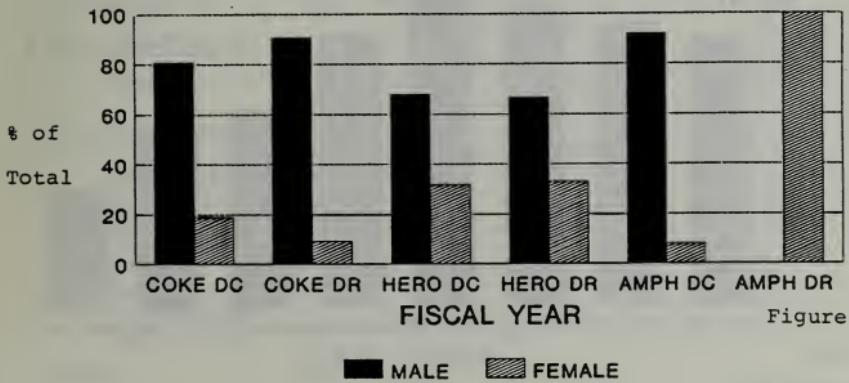


Figure 24.

■ MALE      ■ FEMALE

## SEX DISTRIBUTION

## ABUSE DRUG DEATHS DRUG PRESENT ALONE

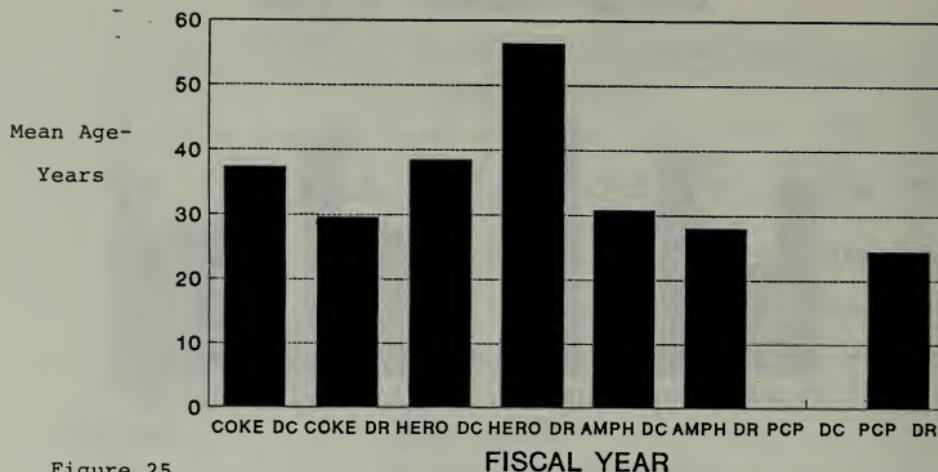


Figure 25.

## ABUSE DRUG DEATHS DRUG PRESENT-COMBINATION

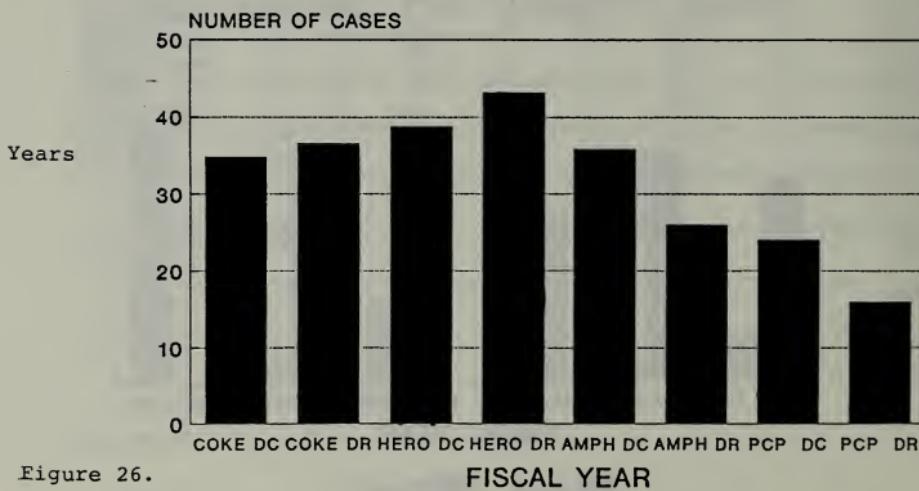


Figure 26.

MEAN AGE

DEATHS INVOLVING COCAINE

TABLE XXXIII. COCAINE PRESENT ALONE

<u>CAUSE OF DEATH</u>	<u>Manner of Death</u>					<u>TOTALS</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UNK</u>	
<u>Drug Caused Deaths</u>						
OVERDOSE	21	0	1	0	0	22
<u>Drug Related Deaths</u>						
GUNSHOT WOUND	0	4	14	0	0	18
STABBING	0	0	4	0	0	4
ASPHYXIA/ STRANG	2	0	1	0	0	3
VEH-AUTO DRIVER	1	0	0	0	0	1
VEH-PEDESTRIAN	0	0	1	0	0	1
VEH-UNKNOWN	1	0	0	0	0	1
DROWNING	1	0	0	0	0	1
HANGING	0	1	0	0	0	1
TRAUMATIC INJ.	0	0	1	1	0	2
INTRACEREBRAL HEMORRHAGE	0	0	0	2	0	2
<b>TOTALS</b>	<b>26</b>	<b>5</b>	<b>22</b>	<b>3</b>	<b>0</b>	<b>56</b>

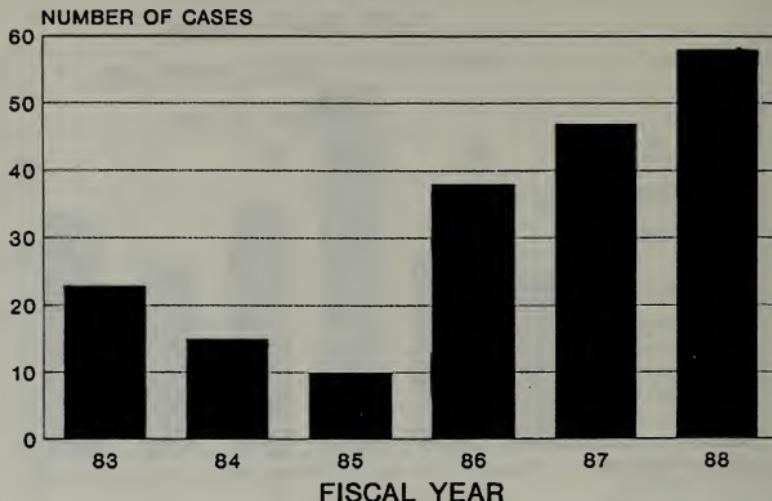
TABLE XXXIV. COCAINE IN COMBINATION WITH OTHER DRUGS

<u>CAUSE OF DEATH</u>	<u>Manner of Death</u>					<u>TOTALS</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UNK</u>	
<u>Drug Caused Deaths</u>						
OVERDOSE	34	0	0	2	0	36
<u>Drug Related Deaths</u>						
GUNSHOT WOUND	0	1	3	0	0	4
PNEUMONIA	2	0	0	0	0	2
HANGING	0	1	0	0	0	1
FALL	1	0	0	0	0	1
STABBING	0	0	1	0	0	1
CARDIAC	1	0	0	0	0	1
ARRHYTHMIA						
CO POISONING	1	0	0	0	0	1
<b>TOTALS</b>	<b>39</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>47</b>

# COCAINE DEATHS

DRUG PRESENT-ALONE OR IN COMBINATION

Figure 27.



# HEROIN DEATHS

Figure 28.

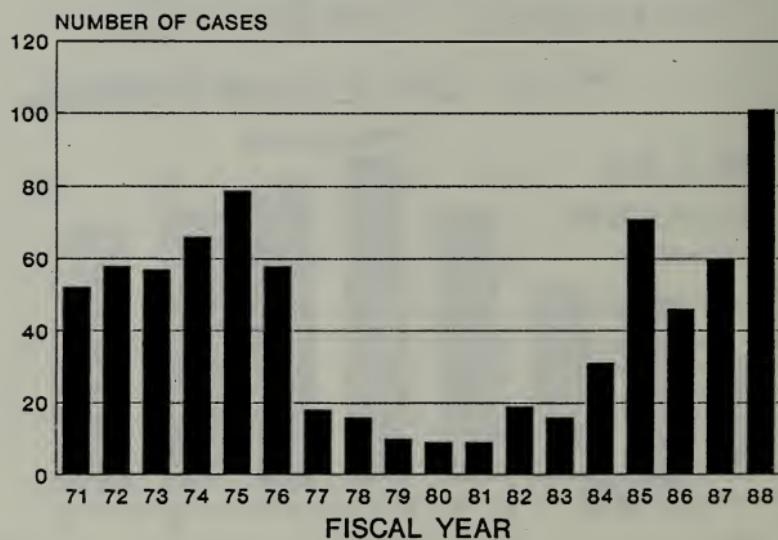


TABLE XXXV. DEATHS INVOLVING HEROINHEROIN PRESENT ALONE

<u>CAUSE OF DEATH</u>	<u>Manner of Death</u>			<u>TOTALS</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	
<u>Drug Caused Deaths</u>				
OVERDOSE	42	0	0	42
<u>Drug Related Deaths</u>				
MYOCARDITIS	1	0	0	1
JUMP	0	1	0	1
<b>TOTALS</b>	<b>43</b>	<b>1</b>	<b>0</b>	<b>44</b>

HEROIN PRESENT IN COMBINATION WITH OTHER DRUGS

<u>CAUSE OF DEATH</u>	<u>Manner of Death</u>				<u>TOTALS</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQUIV</u>	
<u>Drug Caused Deaths</u>					
OVERDOSE	52	6	0	1	59
<u>Drug Related Deaths</u>					
GUNSHOT WOUND	0	1	3	0	4
PNEUMONIA	2	0	0	0	2
ASPHYXIA	0	2	0	0	2
STABBING	0	1	0	0	1
DROWNING	0	1	0	0	1
JUMP	0	1	0	0	1
CARDIAC	1	0	0	0	1
ARRHYTHMIA					
<b>TOTALS</b>	<b>55</b>	<b>12</b>	<b>3</b>	<b>1</b>	<b>71</b>

TABLE XXXVI. DEATHS INVOLVING AMPHETAMINESAMPHETAMINES PRESENT ALONE

<u>CAUSE OF DEATH</u>	<u>Manner of Death</u>					<u>TOTAL</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UNK</u>	
<u>Drug Caused Deaths</u>						
OVERDOSE	5	0	0	0	0	5
<u>Drug Related Deaths</u>						
TRAUMATIC INJURIES	0	2	0	0	0	2
<u>TOTALS</u>	<u>5</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>7</u>

AMPHETAMINES PRESENT IN COMBINATION WITH OTHER DRUGS

<u>CAUSE OF DEATH</u>	<u>Manner of Death</u>			<u>TOTAL</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	
<u>Drug Caused Deaths</u>				
OVERDOSE	13	0	0	13
<u>Drug Related Deaths</u>				
SUBARACHNOID HEMORRHAGE	1	0	0	1
<u>TOTALS</u>	<u>14</u>	<u>0</u>	<u>0</u>	<u>14</u>

## GLOSSARY

ALKALOID OF MORPHINE GROUP	Typically referred to as morphine-type alkaloid, this is the chemical substance found in body fluids after the injection of heroin or other drugs derived from opium
TOXICOLOGY NOT VALID OR ELIMINATED	This term indicates that the deceased lived long enough after the injury to have eliminated some or all toxic agents from the body
FORENSIC PATHOLOGY	The specialty field of medicine involving the application of medical and pathology principles in determining the cause and manner of sudden, unexpected, and medically unattended deaths. This includes the type and nature of injury, public health hazards, type or nature of homicide weapon, the relation of injury to death and interpreting other factors for the court. These data are prepared and presented to the judicial system or public health interests in keeping with the best available knowledge
MODE OF DEATH	Indicates the manner of death, such as natural, accident, suicide or homicide, and is to be distinguished from cause of death, which is purely a medical determination
MODE EQUIVOCAL	With the cause of death determined, investigative data do not clearly differentiate between two modes of death, although some evidence supports one more likely
MODE UNDETERMINED	With the cause of death determined, investigative data do not clearly support one of two possible modes and either one is possible without prejudice
MODE UNKNOWN	Circumstances insufficient to indicate between possible modes, as when only bones are found, or when no medical cause of death is determined
PATHOLOGY	That branch of medicine which deals with the essential nature of disease, especially in the structural or functional changes in tissues, organs or systems of the body causing disease. It involves the diagnosis of disease by microscopic or chemical analysis
SEROLOGY	That branch of pathology which deals with the analysis of blood and body fluids. Blood types for identification, exclusion of a suspect or judicial purposes are examples of the use in this office

TOXICOLOGY

The scientific study of poisons, their detection, actions and treatment. The relationship of drug levels to emotional or personality change, behavioral or reasoning ability are frequent decisions based on these data

MEDICAL EXAMINER

A physician specifically trained in forensic pathology who is responsible for investigating and determining the cause and manner of sudden or unexpected death

AUTOPSY

A scientific dissection of the human body to determine the cause and nature of death in order to detect public health hazards, determine the method or type of death in homicides and improve the level of medical care in the community. In some cases, showing that no injury or wrongdoing was present is of great emotional and stabilizing value to the family







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ANNUAL REPORT  
JULY 1, 1989 - JUNE 30, 1990

BOYD G. STEPHENS, M.D.  
CHIEF MEDICAL EXAMINER

850 BRYANT STREET  
SAN FRANCISCO, CA 94103



CHIEF MEDICAL EXAMINER - CORONER  
CITY AND COUNTY OF  
SAN FRANCISCO, CALIFORNIA

A N N U A L R E P O R T

JULY 1, 1989 - JUNE 30, 1990



BOYD G. STEPHENS, M.D.  
CHIEF MEDICAL EXAMINER

JOSEPH E. SURDYKA  
ADMINISTRATIVE CORONER

DONNA J. ALLISON, PH.D.  
STATISTICIAN AND DATA ANALYST

850 BRYANT STREET  
SAN FRANCISCO, CA 94103





January 1991

Honorable Art Agnos, Mayor  
Honorable Board of Supervisors  
City and County of San Francisco  
City Hall  
San Francisco, California 94102

Dear Mayor Agnos and Honorable Supervisors:

Forensic medicine is the direct application of medicine to the living or the dead in medico-legal cases. We have added to this report information about some of the functions that we perform in order to accurately document the services we provide.

During the 1989-90 fiscal year, there were many management and community problems that required unusual attention. Examples of two fairly major events were the earthquake and the crane accident. Although we were fortunate that the numbers of injured and killed were much lower than could have occurred in only slightly different circumstances, our personnel performed extremely well. The disaster plan worked well and we were easily able to handle the problems presented. Several minor problems regarding supplies and training will be addressed in this next year.

The numbers of homicides is about the same and deaths related to heroin and cocaine continue to increase slightly as have problems with environmental and work place hazards. Deaths involving the amphetamines increased significantly, supporting the suggestion that amphetamines will be the drugs of the 90's.

Almost all the objectives set for the department have been met or exceeded. The computerization of the department is slower than anticipated but is progressing.

I believe the office has performed well over the past year and continues to improve as staffing and support increase to meet ever-increasing demands in our community.

Sincerely,

A handwritten signature in black ink, appearing to read "Boyd G. Stephens".

Boyd G. Stephens, M.D.  
Chief Medical Examiner



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## INTRODUCTION

The Medical Examiner-Coroner is appointed by law to many responsibilities, the foremost of which is the investigation and certification of a variety of deaths including all deaths of other than natural causation, and any apparently natural deaths in which no physician can reasonably state the cause. The Medical Examiner can utilize any and all medico-legal investigative techniques, including autopsy, to establish both the medical cause of death, and mode or circumstances of death (natural, accident, homicide, suicide or undetermined).

The deaths which must be reported to the Medical Examiner-Coroner, as required by various sections of the Government, Health and Safety and Penal codes, are as follows:

1. Homicide - known or suspected
2. Suicide - known or suspected
3. Following accident or injury (whether the accident or injury is the primary cause or contributory, with death occurring immediately or at some remote time)
4. Medical attendance of less than 20 days
5. No physician in attendance
6. Physician unable to state the cause of death (must be unable, not merely unwilling)
7. Poisoning (food, chemical, drug, therapeutic agents)
8. Occupational or industrial deaths
9. All deaths where a patient has not fully recovered from an anesthetic, whether in surgery, recovery room, or elsewhere
10. All deaths in operating rooms
11. All solitary deaths (unattended by physicians or other person in the period immediately preceding death)
12. All deaths in which the patient is comatose throughout the period of the physician's attendance
13. All deaths of unidentified persons
14. All deaths where there are grounds to suspect that the death occurred in any degree from a criminal act
15. All deaths involving contagious disease - known or suspected - and constituting a public health hazard
16. Deaths in prison or while under sentence
17. All deaths associated with a rape - known or alleged - or crime against nature
18. All deaths related to or following abortion - known or suspected
19. All deaths involving drowning, fire, hanging, gunshot, stabbing, cutting, starvation, exposure, alcoholism, drug addiction, strangulation or aspiration

Additional mandated responsibilities include protection and safekeeping of property belonging to deceased individuals, conducting inquests when indicated, maintaining proper public records, making reports to other agencies, identification of deceased persons, interment of indigent dead, and many other death-related activities.

The work with the living is discussed elsewhere.



## FORENSIC MEDICINE

Forensic medicine generally is considered to be a marriage of medicine and the forensic sciences oriented to medico-legal issues. The field is wide-ranging and growing, becoming even broader in scope than the traditional concept as practiced in Europe.

There has been continued growth and accentuation of the role of forensic medicine in the legal and medico-legal world over the past year. This office has continued its role in forensic medicine for both living and dead, playing a vital role in the community.

We serve in a number of places in the community. Some of these include:

### Examination and diagnosis of the living:

- Examination and evaluation of child abuse
- Examination and evaluation of sexual assault
- Examination and evaluation of spousal abuse
- Evaluation of citizens' complaints against the police department
- Testimony and interpretation of hospital records and procedures
- Evaluation of force and patterned injuries
- Examination of victims and suspects for trace evidence and injuries
- Collection of blood from suspects and victims for serology, toxicology and other testing
- Court testimony on force, great body injury (GBI) and other issues
- Alcohol and drug interaction in driving under the influence cases and related issues
- Physiologic effects of drug interactions
- Toxicology, including environmental and industrial toxicities
- Teaching - hospital, forensic, law enforcement, community

### Examination and evaluation of the dead:

- Scene investigation, reconstruction and analysis
- Evidence collection and testing
- Blood spatter analysis and interpretation
- Patterned evidence analysis and interpretation
- Trace evidence collection
- Time and place of death information
- Forensic autopsy - consultation and interpretation
- Analysis for chemical and limited serology testing
- Forensic toxicology
- Consultation with District Attorney and Public Defender
- Reconstruction Analysis and court presentation
- Teaching - forensic and legal

Because of significant shortages in professional staff, we have had to reduce the amount of work that we can do in some of the above areas, but every effort is being made to bring the medical staff up to the approved number and to return to full service activity.

The department faces some significant problems now and for the future. One of these is the increasing numbers of "designer drugs" which are made for a number of reasons, including avoidance of existing Federal laws. These chemical analogues or new molecules constantly require new analytic approaches, techniques and standards. Hazards to users, officers and laboratory personnel are largely unknown, and some of the compounds are so dangerous that skin contact can be lethal or can produce delayed complications, such as Parkinson's degeneration of the brain.

The earthquake caused many problems in the City but relatively few deaths. We were easily able to handle the recovery, identification and processing of these victims with our regular staff. However, since the total numbers were unknown at the onset, and the press were indicating large numbers of deaths, we activated our disaster plan. The emergency facilities and employee response were excellent. Although some problems became evident, these were considered to be minor and are being addressed in the current budget and in personnel training.

The collapse of the tower crane represented another major event in the City. We were able to handle the scene investigation, recovery and identification of the victims with our regular staff without activating the disaster plan. We had excellent cooperation from the Department of Public Works in the recovery process and from the OSHA investigator in the explanation of what had caused the accident.

The need for ever-increasing scientific capabilities in instrumentation and techniques results in a requirement for increased training and equipment for the department. There is a need for increased interfacing with other agencies and departments along with a need for information sources and sharing. These are some of the major problems for the future. The information and records issue constitutes a major decision and policymaking step over the next five years. Although initial costs to the County will be relatively high, the long-term benefits and cost savings will more than offset this investment of time and money. Obtaining access to major library data bases, legal information, and records management constitute some of the most expensive and time-consuming aspects of departmental management for this next five year period. The forensic world is growing so rapidly that it is difficult to foresee its exact direction. Trace evidence and DNA serology are unquestionably going to be a large part of that future for the next five years.

We have changed the format of this report slightly, adding more interpretation of the data and changing the presentation to enhance data recognition. New graphs have been added to illustrate some points or relations among the data. The major categories have been graphed to show trends over time.

DEPARTMENTAL COSTS

1988 - 1989

Total Budget	\$2,255,461.00
Transfers to controller, Health and Retirement	\$ 356,236.00
NET BUDGET (all other costs)	1,899,225.00
Total Cases	4,561
Cost per case investigated	\$ 416.00
Revenues (sales of records, public auctions, fee-for-service work)	\$ 33,133.00
Total Costs <u>Ad Valorum Taxes</u> <u>per case investigated</u>	\$ 409.00

As indicated elsewhere, this includes all investigative, administrative, scientific and expert witness costs to the County.

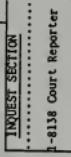
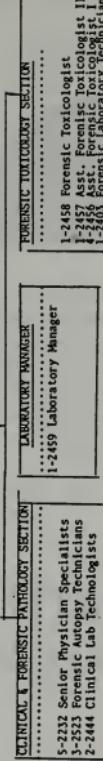
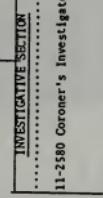
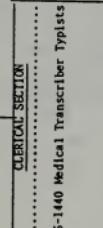
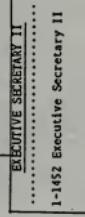
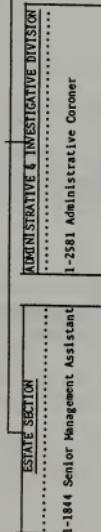


**ORGANIZATIONAL CHART**  
**MEDICAL EXAMINER'S OFFICE**

CHIEF MEDICAL EXAMINER-CORONER

.....

1-2584 Chief Medical Examiner Coroner



# COUNTY DEATHS 1989-90

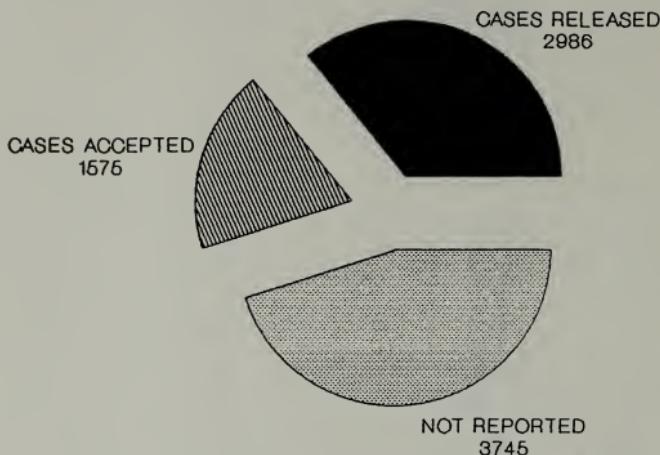


Figure 1.

## MANNER OF DEATH 1989-90 JURISDICTION ON 1,575 CASES

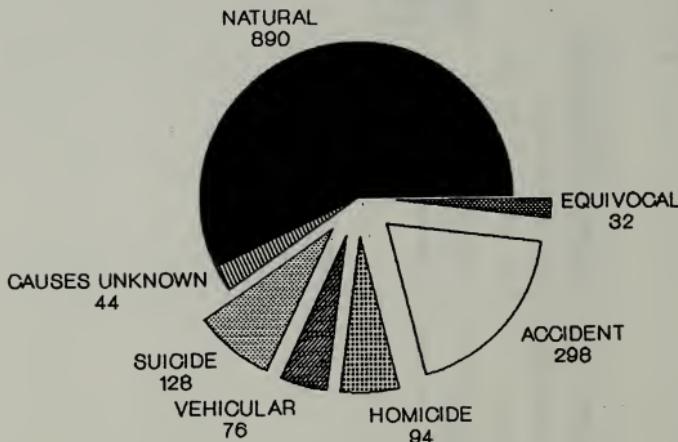


Figure 2.

FISCAL YEAR 1989-90

Total Deaths in County	8,306
Total Deaths Reported to Medical Examiner	4,561
Cases Reported, Investigated and Cleared by the Medical Examiner for physician's signature	2,986
Medical Examiner's Cases	1,575
% Reported to Medical Examiner	54.9
% County Deaths Having Medical Examiner's Jurisdiction	19.0

Cases Accepted by the Medical Examiner (by manner of death)\*

1. Natural Deaths (NC)	890	(56.5%)
2. Accidents (ACC)	298	(18.9%)
3. Suicides (SUI)	128	( 8.1%)
4. Homicides (HOM)	94	(6.0%)
5. Mode Equivocal (EQ)	32	(2.0%)
6. Cause Unknown (UNK)	44	(2.8%)
7. Sudden Infant Death Syndrome (SIDS)	13	(0.8%)
8. Vehicular	76	(4.8%)
9. Private Autopsies	2**	

\*\*Not included in above figures.

Autopsies performed 1,317

Autopsy Index 84%

Dispositions Authorized by the Medical Examiner

1. Indigents and fetus dispositions	133
2. Cases buried by funeral home with Public Administrator-controlled funds	30

Inquests Held or Depositions Taken 20

Identification

1. Persons brought to Medical Examiner's Office with insufficient identification	209
2. Persons subsequently identified by fingerprints, dental X-rays or other means	201
3. Persons buried as unidentified	8
4. Fingerprints taken and forwarded to FBI, CII, or SFPD	1,468

\* The abbreviations following each manner of death will be used in most tables in this report.

In the fiscal year 1989-90, there were 8,306 deaths in San Francisco County. Of these deaths, 4,561 were reported to the San Francisco Medical Examiner-Coroner's Office. The Coroner's Investigators examined the previous medical history, circumstances surrounding the deaths and, in many cases, the scene of the death, and determined that 1,575 of these deaths came under the jurisdiction of this office. See Figure 1, page 8). Autopsies were performed on 84% of these cases.

1. The highest total number of deaths occurred in January, 1990, as did the highest number of suicides. The highest number for other manners of death occurred during other months (e.g. highest number of accidental deaths in both October and March, highest number of homicides in both January and March). See Table I and Figure 3, page 11.
2. The racial distribution for each manner of death was quite variable. For example, the value of the ratio of whites/blacks was 3.4 for accidents, 27.8 for suicides (as compared to 14.0 for 1988-89), and 1.0 for homicides. See Table II, page 12.
3. The age range distribution for each manner of death was also variable. For example, the highest number of accidental deaths and suicides occurred in the 30-39 year age group, while the highest number of homicides occurred in the 20-29 year age group. During this fiscal year as compared to the previous year, the number of accidental deaths in the age group of 60-89 increased by 31%, from 45 to 59 while the number of suicides in this age group decreased from 51 to 24, a decrease of 53%! The reasons for these differences will be discussed in a later section on accidental deaths. See Table III, page 12.
4. The overall distribution of deaths by sex (ratio of male/female) was 2.0, but this varied by manner of death from 1.9 in deaths due to natural causes to 5.7 in homicide deaths. See Table IV and Figure 4, page 13.

MEDICAL EXAMINER CASES FOR 1989-90

TABLE I. MANNER OF DEATH - MONTHLY COMPARISON

Month of Death	Manner of Death								TOTALS
	ACC	HOM	SUI	NC	VEH*	SIDS#	EQ	UNK	
July	21	9	11	60	3	0	1	4	109
August	20	7	12	79	1	1	0	3	123
September	29	4	12	65	6	2	1	5	124
October	30	8	12	68	6	0	1	7	132
November	21	3	10	63	8	0	1	7	113
December	23	5	9	91	8	1	2	5	144
January	28	12	15	88	6	2	6	3	160
February	29	2	10	75	11	1	5	1	134
March	30	12	10	91	7	1	2	3	156
April	23	10	9	80	6	3	1	2	134
May	19	9	10	69	8	2	2	3	122
June	25	13	8	61	6	0	10	1	124
TOTALS	298	94	128	890	76	13	32	44	1575

\* VEH = Vehicular Deaths. These include 10 deaths ruled to be homicide, 65 cases ruled to be accidental and 1 case ruled to be equivocal.

# SIDS = Sudden Infant Death Syndrome

MONTHLY COMPARISON  
MANNER OF DEATH

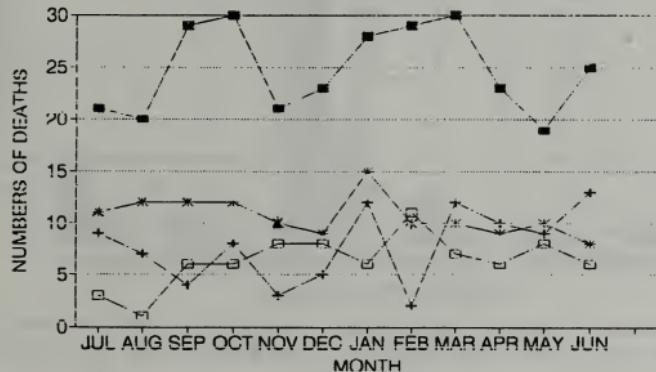


Figure 3.

TABLE II. MANNER OF DEATH BY RACE

## Manner of Death

Race	ACC	HOM	SUI	NC	VEH*	SIDS#	BQ	UNK	TOTALS
White	209	37	111	654	44	7	22	25	1109
Black	62	37	4	146	13	4	7	14	287
Asian	21	14	11	82	19	1	3	3	154
Other	6	6	2	8	0	1	0	2	25
<b>TOTALS</b>	<b>298</b>	<b>94</b>	<b>128</b>	<b>890</b>	<b>76</b>	<b>13</b>	<b>32</b>	<b>44</b>	<b>1575</b>

TABLE III. MANNER OF DEATH BY AGE

## Manner of Death

Age Group	ACC	HOM	SUI	NC	VEH*	BQ	UNK	TOTALS
0-11 months	4	4	0	28#	0	1	7	44
1-5 years	2	0	0	1	0	1	2	6
6-12 years	1	1	0	0	1	0	1	4
13-16 years	0	2	0	1	1	0	0	4
17-19 years	1	7	1	1	5	1	2	18
20-29 years	32	26	18	11	17	7	4	115
30-39 years	100	25	39	50	13	10	11	248
40-49 years	64	15	30	88	6	3	8	214
50-59 years	27	5	12	129	8	2	1	184
60-69 years	20	5	11	200	10	2	3	251
70-79 years	18	2	6	203	7	2	2	240
80-89 years	20	0	7	153	8	2	1	191
90+ years	9	2	4	37	0	1	0	53
Unknown	0	0	0	1	0	1	2	3
<b>TOTALS</b>	<b>298</b>	<b>94</b>	<b>128</b>	<b>903</b>	<b>76</b>	<b>32</b>	<b>44</b>	<b>1575</b>

# Includes 13 SIDS (Sudden Infant Death Syndrome) deaths

\* VEH = Vehicular deaths. These include 10 deaths ruled to be homicide, 65 cases ruled to be accidental, and 1 case ruled to be equivocal

TABLE IV. MANNER OF DEATH BY SEX

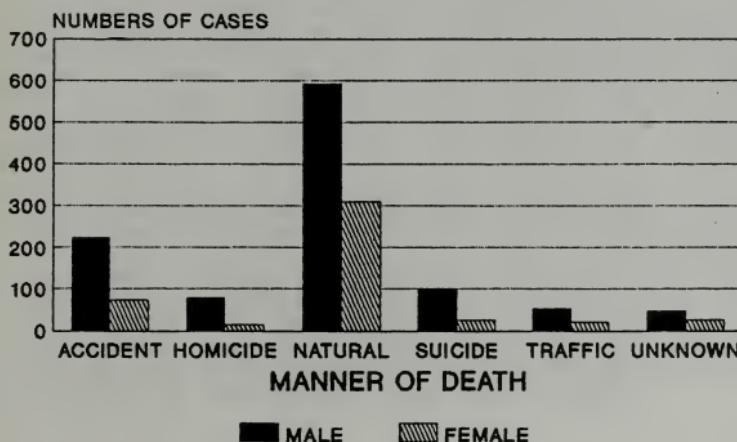
## Manner of Death

Sex	ACC	HOM	SUI	NC	VEH*	SIDS#	EQ	UNK	TOTALS
M	224	80	101	584	54	9	18	30	1100
F	74	14	27	306	22	4	14	13	474
Unknown	0	0	0	0	0	0	0	1	1
<b>TOTALS</b>	<b>298</b>	<b>94</b>	<b>128</b>	<b>890</b>	<b>76</b>	<b>13</b>	<b>32</b>	<b>44</b>	<b>1575</b>

\* = Vehicular deaths. These include 10 cases ruled to be homicide, 65 cases ruled to be accidental and 1 ruled to be Mode Equivocal.

Figure 4.

## MANNER OF DEATH BY SEX





## YEARLY COMPARISON OF MEDICAL EXAMINER - CORONER'S CASES

Comparisons of manners of death as well as methods used over the last eight fiscal years are presented in this section. The most significant differences which have occurred over the last eight years which can be observed in these tabulations include:

1. Regarding manners of death, the number of homicides (94) during fiscal year 1989-90 increased only slightly from the previous fiscal year. The number of accidental deaths increased by 40 (16%) from 1988-89. In part, this increase is attributable to deaths which occurred in the October 1989 earthquake (12) and in the November 1989 crane accident (5). The number of cases ruled to be suicide (128) was the lowest for any of the last eight years. Also, the number of deaths due to natural causes which came under the jurisdiction of this office was the lowest seen for any year during the past eight years. (See Table V and Figure 5, page 16 and Figure 2, page 8).
2. With respect to the methods used in homicide deaths, the most notable difference from the previous fiscal year is a 55% decrease in deaths due to traumatic injuries. The number of such deaths (10) was the lowest number observed for any fiscal year since 1983-84. Another notable change was a 49% increase in homicides from firearms (from 41 in 1988-89 to 61 in 1989-1990). The number of deaths by firearms is the highest seen in the last eight fiscal years and accounted for 65% of homicide deaths (See Table VI and Figure 6, page 17).
3. The total number of suicide deaths showed a dramatic 25% decrease from fiscal year 1988-89 to the lowest number seen for any year during the last eight fiscal years. This overall decrease resulted in large part from the 77% decrease in deaths due to jumps from buildings. There were also notable decreases in deaths resulting from overdoses of drugs and/or poisons (30% decrease) and suicides by firearms (20% decrease). However, firearms are the leading method used in suicidal deaths (27% of all suicides). There were increases in the number of individuals dying from intentional carbon monoxide poisoning (3.5 fold increase) and by hanging (36% increase) (See Table VII and Figure 7, page 18).
4. Regarding deaths ruled to be accidental, the increase in deaths due to drugs continued (9%) but at a less rapid rate than seen in the previous fiscal year. Accidental deaths due to aspiration more than doubled (from 5 to 13) over the previous fiscal year. There were no accidental deaths due to firearms during 1989-90. Deaths due to smoke inhalation decreased by 64% while deaths due to burns increased 400%. The number of accidental deaths due to falls was at the lowest level seen over the last 8 years. However, the number of deaths from falls is still second only to deaths from drugs as a leading cause of accidental deaths (See Table VIII and Figure 8, page 19 and Figure 9, page 20).

YEARLY COMPARISONS OF MEDICAL EXAMINER-CORONER'S CASES

TABLE V. YEARLY COMPARISON OF MANNER OF DEATH

Fiscal year

Manner of Death	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88	'88-'89	'89-'90
Accident	245	230	214	231	222	258	258	298
Homicide	103	84	95	120	110	110	91	94
Suicide	173	182	153	161	171	162	171	128
Natural	1154	1082	1210	1150	1040	1074	1010	903
Vehicular*	74	51	60	61	46	75	71	76
Equiv/Undet	55	42	55	63	62	82	85	76
TOTALS	1804	1671	1787	1786	1651	1761	1686	1575

\* Vehicular deaths include 10 cases ruled to be homicide, 65 cases ruled to be accidental, and 1 case ruled to be Mode Equivocal or Undetermined.

**Figure 5. MANNER OF DEATH COMPARISON BY YEAR**

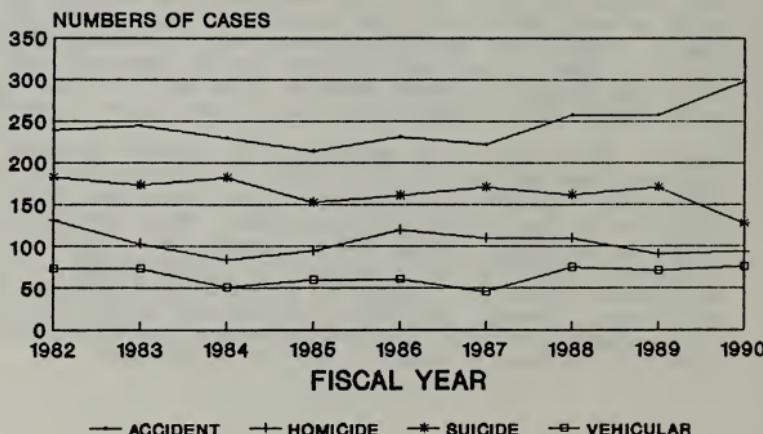


TABLE VI. YEARLY COMPARISON OF HOMICIDE METHODS USED

Fiscal year

Method Used	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88	'88-'89	'89-'90
Firearms	47	27	26	40	41	48	41	61
Stabbing	28	26	31	34	32	35	21	17
Traum. Inj.	5	5	19	18	21	23	22	10
Vehicular	-	10	7	11	7	13	16	10
Asphyxiation	12	8	8	8	8	3	5	3
Other	1	5	4	9	1	1	2	3
TOTALS	103	84	95	120	110	123	107	104

Figure 6.

## HOMICIDES YEARLY COMPARISON

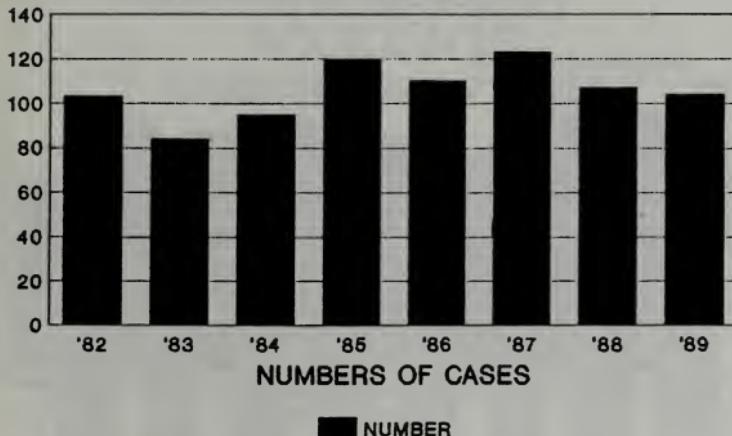


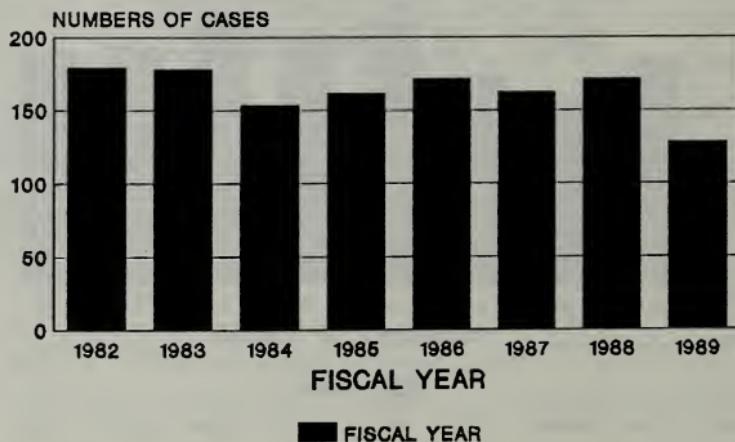
TABLE VII. YEARLY COMPARISON OF SUICIDE METHODS USED

Fiscal year

Method Used	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88	'88-'89	'89-'90
Firearms	36	48	34	46	45	42	44	35
Poisoning	46	38	34	36	32	32	44	31
Hanging	26	28	29	28	29	28	17	23
Jump/GG Brdg	22	19	18	17	19	18	15	10
CO Poisoning	7	4	8	6	6	2	2	9
Jump/Building	16	23	15	16	19	19	30	7
Asphyx/strang	2	1	1	2	3	7	7	6
Cut/stab	7	10	4	5	9	8	5	3
Jump/Bay Brdg	1	2	0	0	1	1	2	2
Other	1	2	10	1	2	2	1	2
Drowning	9	1	0	3	6	3	2	0
Burning	6	2	0	1	0	0	2	0
TOTALS	179	178	153	161	171	162	171	128

Figure 7.

## SUICIDES COMPARISON BY YEAR



THROUGH 89-90

TABLE VIII. YEARLY COMPARISON OF ACCIDENTAL\* DEATH SITUATIONS

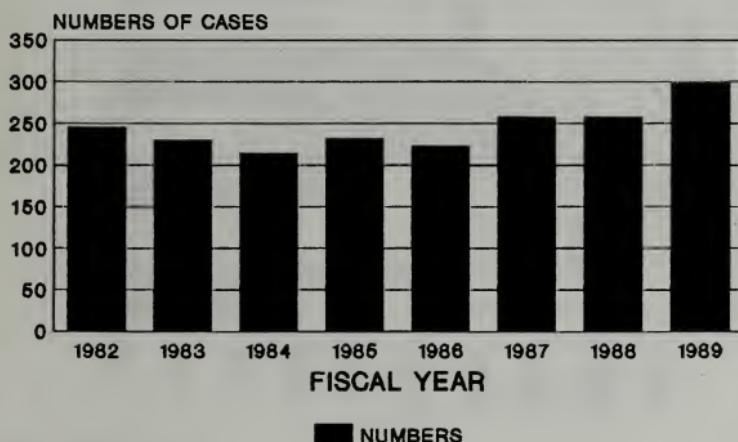
Fiscal year

Situation	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88	'88-'89	'89-'90
Drugs/Poisons	71	66	78	96	92	100	144	157
Falls	68	82	74	67	80	76	54	53
Burns	38	33	14	15	6	12	3	15
Aspiration	21	9	14	7	8	10	5	13
Drowning	12	3	6	9	5	14	11	10
Mult. trauma	-	-	-	-	-	-	-	12
Head Trauma	-	-	-	-	-	-	-	11
Asphyxia	3	3	2	6	4	2	8	8
Med. Misadv.	-	-	-	-	12	13	6	7
Other	28	35	22	29	3	7	2	5
Smoke inhal.	3	1	3	0	9	8	11	4
Drug/Alcohol	-	-	-	-	-	13	9	3
Abuse Rel.								
Hanging	-	-	-	-	-	2	2	0
Firearms	1	1	1	2	1	1	3	0
TOTALS	245	230	214	231	222	258	258	298

\* Vehicular deaths are not included in this tabulation.

Figure 8.

## ACCIDENTS COMPARISON BY YEAR



THROUGH 1988-90

Figure 9.

## YEARLY COMPARISON OF ACCIDENTAL DEATHS DUE TO DRUGS, ASPIRATION AND FALLS

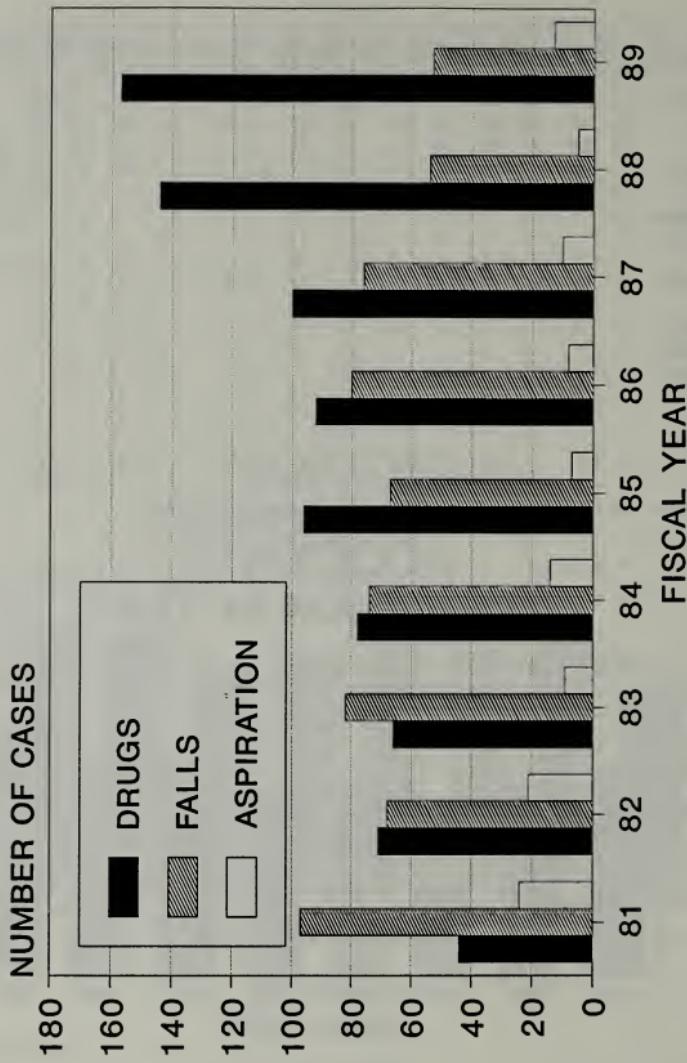


TABLE IX. VIOLENT DEATHS

Of the 1,575 deaths investigated by the Medical Examiner's Office during 1989-90, 627 were determined to be the result of violence.

<u>Mode</u>	<u>Total No.</u>	<u>% of Coroner's Cases</u>	<u>% of County Deaths</u>
ACCIDENT	363	23.1	4.4
Vehicular	65	4.1	
Non-vehicular	298	19.0	
SUICIDE	128	8.1	1.5
HOMICIDE	104	6.6	1.2
Vehicular	10	0.6	
Non-vehicular	94	6.0	
EQUIVOCAL	32	2.0	0.4
Vehicular	1	0.06	0.01
Non-vehicular	31	2.0	0.4

## VIOLENT DEATHS IN 1989-90

Total = 627

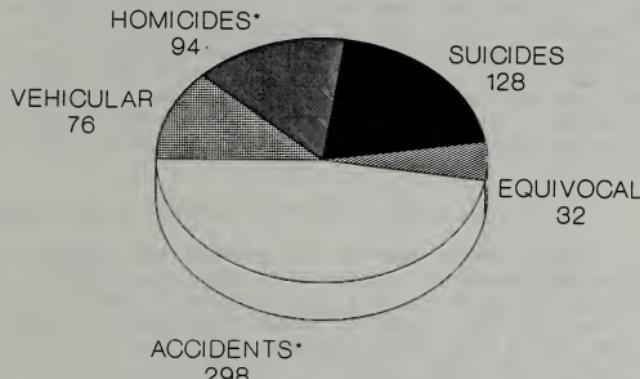


Figure 10.

\* = NON-VEHICULAR



## ACCIDENTAL DEATHS

Three hundred and sixty-three deaths were ruled to have been due to accidental means during the 1989-90 fiscal year. The number of individuals dying by each manner of accidental death are indicated in Figure 11, page 25 and Table X, page 26, and the percentages of all accidental deaths represented by each manner are indicated on Table X, page 26.

Of the accidental death victims tested for alcohol and drugs (i.e. those in the hospital for less than 24 hours), a large percentage had significant levels of alcohol in their blood as well as having abuse drugs present (See Table X, page 26).

### Abuse Drug Involvement (Table XI, page 27)

Overall, the number of accidental death cases where abuse drugs were present increased from fiscal year 1988-89 (187 cases) to fiscal year 1989-90 (212 cases), a 13% increase. This increase from one fiscal year to the next was much lower than the 43% increase from 1987-88 to 1988-89. Of the deaths caused by drugs, heroin (measured as morphine) was seen most frequently. The second most frequently seen abuse drug was cocaine. The number of cases with cocaine present increased by 13% from the previous fiscal year (64 to 72), the number of cases with heroin present increased only 3% (from 102 to 105 cases, while deaths with amphetamine present increased 89% during this same time period (from 19 to 32). Abuse drugs may have played a role in accidental deaths by falls (4 cases), drowning (1 case) and smoke inhalation (1 case).

### Racial Distribution (Figure 12, page 28 and Table XII, page 29).

Overall, accidental deaths occurred most frequently in whites. Accidental deaths due to burns increased 5-fold from 1988-89 to 1989-90 (from 3 to 15). Such deaths occurred more frequently in whites (80%) and less frequently in Asians (0%) than would be anticipated by the overall involvement of these racial groups in accidental deaths. Also, Asians are more heavily represented in vehicular deaths with 26% of accidental vehicular deaths involving Asians, and deaths by asphyxia, drowning and multiple trauma than would be expected based on the general involvement of Asians in all types of accidental deaths. During fiscal year 1989-90, there were no accidental deaths due to firearms or hanging.

### Age Distribution (Figure 13, page 30 and Table XIII, page 31).

Deaths due to asphyxia and drowning are the most common causes of accidental deaths in the youngest age group (0-5 years). Accidental deaths in the age group from 6 to 19 years constitute only 1.7% of all accidental deaths. The most common causes of accidental deaths in people over 60 years of age are aspiration (61% of all aspiration deaths), burns (67% of all deaths due to burns), falls (59% of all deaths due to falls), smoke inhalation (50% of all deaths due to smoke inhalation), and vehicular accidents (35% of all such deaths). As noted in last year's report, there was a decrease seen in the

Age Distribution (Continued).

number of deaths due to falls in people over 60 years of age from 1987-88 to 1988-89 (from 54 to 30). During fiscal year 1989-90, there were only 31 such deaths, virtually no different from the preceding fiscal year. Deaths due to drug overdoses are concentrated in the 20-49 year age group with 49% of all deaths due to drug overdoses in the 30-39 year age group.

Distribution by Sex (Table XIV, page 32).

Males are three times more likely than females to be the victims of accidental deaths. This difference is even more pronounced in deaths due to head trauma and drug overdoses and is less pronounced in deaths due to aspiration, burns and smoke inhalation. The increase in deaths from drug overdoses as compared to the previous fiscal year involved only deaths in males (22% increase) while the drug overdose deaths in females decreased by 31% (from 36 to 25 individual deaths).

## NON-VEHICULAR ACCIDENTS

This category includes all unintentional fatalities. There were 298 accidental deaths (non-vehicular) which accounted for 19% of the Medical Examiner death investigations for the fiscal year of 1989-90.

## CIRCUMSTANCES OF NON-VEHICULAR ACCIDENTAL DEATHS IN 1989-90

### TYPES OF DEATHS

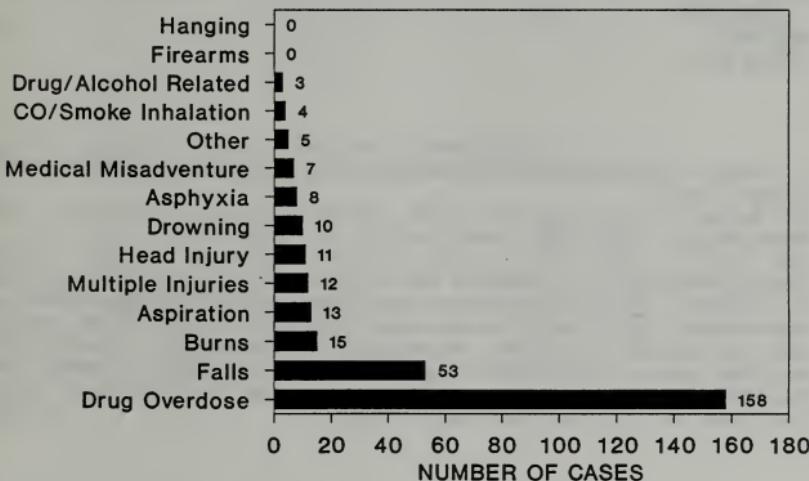


Figure 11.

TABLE X. ACCIDENTAL DEATHS BY MODE

## Drug and Alcohol Involvement

METHOD	NUMBER	% OF TOTAL ACCIDENTS	% ALC.*	AVE. ALC. CONC (g%)	% DRUGS**
DRUG O.D.	158	43.4	46	0.18%	92
VEHICULAR	65	17.9	38	0.21%	7
FALLS	53	14.6	33	0.20%	12
BURNS	15	4.1	29	0.20%	0
ASPIRATION	13	3.6	22	0.26%	0
MULT. TRAUMA	12	3.3	0	-	0
HEAD TRAUMA	11	3.0	30	0.05%	0
DROWNING	10	2.7	10	0.33%	13
ASPHYXIA	8	2.2	20	0.27%	0
MEDICAL	7	1.9	0	-	0
MISADVENTURE					
OTHER	5	1.4	60	0.22%	50
SMOKE/CO INHALATION	4	1.0	25	0.20%	25
DRUG/ALC ABUSE REL.	3	0.8	0	-	50

\* Refers to percentage of victims (of those tested) with positive blood ethyl alcohol levels.

\*\* Refers to percentage of victims (of those tested) with positive tests for abuse drugs.

Overall, alcohol was present in the systems of over one-fourth of those dying in accidents and may have been a contributing factor in the accident. Also, the average blood ethyl alcohol concentration has increased for nearly every mode of accident as compared to the previous fiscal year. It should be noted that the average blood ethyl alcohol concentrations for all modes, except for head trauma, when present, are substantially over the level of 0.08% which is considered to be intoxicated when driving.

TABLE XI. ABUSE DRUGS PRESENT IN NON-VEHICULAR ACCIDENTS

<u>Situation</u>	<u>DRUGS</u>			
	<u>Cocaine</u>	<u>PCP</u>	<u>Morphine</u>	<u>Amphetamines</u>
ASPHYXIA/SUFFOCATION	0	0	0	0
ASPIRATION	0	0	0	0
BURNS	0	0	0	0
FALLS	2	0	2	0
DROWNING	1	0	0	0
DRUG/ALCOHOL ABUSE REL.	1	0	0	0
MEDICAL MISADVENTURE	0	0	0	0
DRUG OVERDOSE	66	3	103	32
SMOKE/CO INHALATION	1	0	0	0
MULTIPLE TRAUMA	0	0	0	0
HEAD TRAUMA	0	0	0	0
OTHER	1	0	0	0
TOTALS	72	3	105	32

\* Drugs may have been present singly or in combination

\*\* Drugs used therapeutically are not included in this tabulation

Overall, the number of accidental death cases where abuse drugs were present increased 13%, from 187 in 1988-89 to 212 in 1989-90. The number of deaths due to an overdose of cocaine increased from 64 in 1988-89 to 72 in 1989-90, a 13% increase. The number of deaths due to an overdose of heroin (measured as morphine), increased only 3%, from 102 in 1988-89 to 105 in 1989-90. The number of deaths where PCP was present increased from 2 in 1988-89 to 3 in 1989-90. The most remarkable change was seen in accidental deaths in which amphetamines were present - there was an 89% increase, from 19 in 1988-89 to 32 in 1989-90.

## RACE OF ACCIDENT VICTIMS FY 1989-90

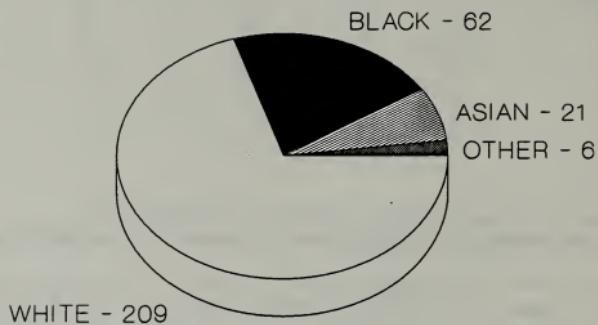


Figure 12.

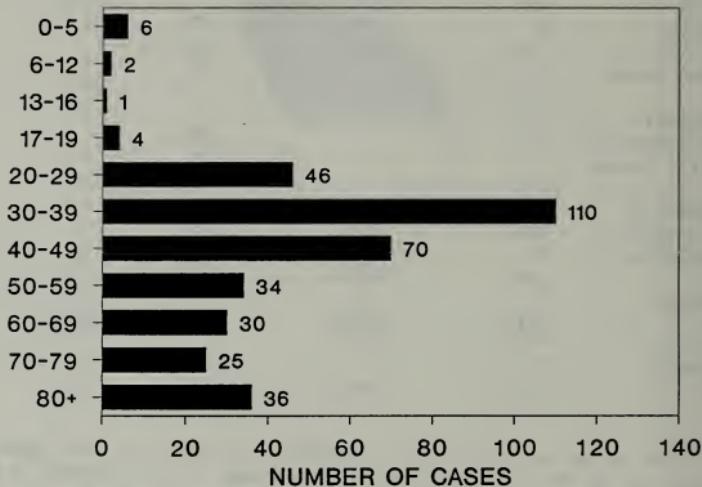
TABLE XII. ACCIDENTAL DEATH SITUATIONS BY RACE

Method	<u>Race</u>				<u>Total</u>
	<u>White</u>	<u>Black</u>	<u>Asian</u>	<u>Other</u>	
Asphyxia	4 (50%)*	2 (25%)	2 (25%)	0	8
Aspiration	9 (69%)	1 (8%)	2 (15%)	1 (8%)	13
Burns	12 (80%)	3 (20%)	0	0	15
Drowning	5 (50%)	1 (10%)	4 (40%)	0	10
Drug/Alcohol Abuse Rel	2 (67%)	1 (33%)	0	0	3
Drug O.D.	110 (70%)	45 (28%)	0	2 (1%)	157
Falls	40 (75%)	6 (11%)	7 (13%)	0	53
Head Trauma	9 (82%)	1 (9%)	0	1 (9%)	11
Medical Misadventure	5 (71%)	0	2 (29%)	0	7
Mult. Trauma	8 (67%)	0	3 (25%)	1 (8%)	12
Smoke/CO Inhalation	2 (50%)	1 (25%)	1 (25%)	0	4
Vehicular	38 (58%)	10 (15%)	17 (26%)	0	65
Other	3 (60%)	1 (20%)	0	1 (20%)	5
Totals	247 (70%)	72 (20%)	38 (10%)	6 (2%)	363

\* Row percentages refer to percentages by race for each mode. These can be compared to total percentages for each race to see whether a mode is more or less prevalent in a racial group. For instance, deaths from head trauma appear to occur more frequently in whites (82%) than the general involvement of whites in accidents (68%). Vehicular deaths occur more frequently in Asians (26%) than would be predicted by the involvement of Asians in accidental deaths overall (10%). Conversely, deaths due to falls appear to occur less frequently in blacks (11%) than would be anticipated, based on the involvement of blacks in accidental deaths (20%).

## AGE OF ACCIDENTAL DEATH VICTIMS FY 1989-90

AGE IN YEARS



Includes vehicular deaths

Figure 13.

TABLE XIII. ACCIDENTAL DEATH SITUATIONS BY AGE

Age Range

<u>Method</u>	<u>0-5</u>	<u>6-12</u>	<u>13-16</u>	<u>17-19</u>	<u>20-29</u>	<u>30-39</u>	<u>40-49</u>	<u>50-59</u>	<u>60-69</u>	<u>70-79</u>	<u>80+</u>
Asphyxia	3 (38%)*	0	0	0	0	1 (12%)	2 (25%)	0	1 (12%)	1 (12%)	0
Aspiration	0	0	0	0	1 (8%)	2 (15%)	1 (8%)	1 (8%)	1 (8%)	5 (38%)	2 (15%)
Burns	1 (7%)	0	0	0	0	0 (20%)	3 (7%)	1 (20%)	3 (20%)	3 (20%)	4 (27%)
Drowning	2 (20%)	0	0	0	2 (20%)	1 (10%)	1 (10%)	2 (20%)	0	0	2 (20%)
Drug/Alc Abuse Rel	0	0	0	0	0	3 (100%)	0	0	0	0	0
Drug O.D.	0	0	0	1 (1%)	19 (12%)	78 (49%)	44 (28%)	11 (7%)	4 (3%)	0	0
Falls	0	1 (2%)	0	0	4 (8%)	5 (9%)	4 (8%)	8 (15%)	9 (17%)	4 (8%)	18 (34%)
Head Trauma	0	0	0	0	2 (18%)	1 (9%)	3 (27%)	2 (18%)	1 (9%)	1 (9%)	1 (9%)
Medical Misad.	0	0	0	0	0 (29%)	2 (29%)	0 (29%)	2 (29%)	0	3 (43%)	0
Mult. Trauma	0	0	0	0	3 (25%)	4 (33%)	4 (33%)	0	0	1 (8%)	0
Smoke/CO Inhal.	0	0	0	0	1 (25%)	1 (25%)	0 (25%)	0 (25%)	0 (25%)	0 (25%)	2 (50%)
Vehicular	0	1 (2%)	1 (2%)	3 (5%)	14 (22%)	10 (15%)	6 (9%)	7 (11%)	10 (11%)	7 (15%)	6 (11%)
Other	0	0	0	0	0 (40%)	2 (20%)	1 (20%)	0 (20%)	1 (20%)	1 (20%)	0 (20%)
<b>TOTALS</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>4</b>	<b>46</b>	<b>110</b>	<b>69</b>	<b>34</b>	<b>30</b>	<b>26</b>	<b>35</b>
% OF TOTAL	2%	1%	.3%	.6%	14%	29%	21%	8%	8%	8%	7%

\* Row percents refer to percentage by age range for each mode. These can be compared to total percentages for each age range to see if a mode is more or less prevalent in an age group. For example, asphyxia occurred more frequently in the 0-5 years of age group (38%) than the general involvement of this age group in accidents (2%) while falls in the 30-39 year age group (9%) occurred less frequently than all accidents in this age group (30%). Falls in the age group 60-80+ occurred more frequently (59%) than all accidents in this age group (23%).

TABLE XIV. ACCIDENTAL DEATH SITUATIONS BY SEX

Method	Sex	
	Male	Female
Asphyxia	5 (62%)*	3 (38%)
Aspiration	7 (54%)	6 (46%)
Burns	8 (53%)	7 (47%)
Drowning	7 (70%)	3 (30%)
Drug/Alcohol Abuse Related	2 (67%)	1 (33%)
Drug O.D.	132 (84%)	25 (16%)
Falls	36 (68%)	17 (32%)
Head Trauma	9 (82%)	2 (18%)
Medical Misadven.	4 (57%)	3 (43%)
Multiple Trauma	9 (75%)	3 (25%)
Smoke/CO Inhal.	1 (25%)	3 (75%)
Vehicular	48 (74%)	17 (26%)
Other	4 (80%)	1 (20%)
TOTALS	272	92
% OF TOTAL	75%	25%

\* Row percents refer to percentages by sex for each mode. These can be compared to total percentages for each sex to see whether a mode is more or less prevalent in one sex. For example, drug overdoses appears to occur more frequently in males (84%) than the general involvement of males in accidents (75%), while deaths from smoke inhalation occur more frequently in females (75%) than all accidents in females (25%).

## VEHICULAR DEATHS

In the 1989-90 fiscal year, there were seventy-six vehicular fatalities in San Francisco. The number of vehicular fatalities by type are indicated in Figure 14, page 34 and Table XV, page 35. The percentages of all vehicular fatalities represented by each type are shown on Table XV, page 35. The largest number of vehicular fatalities involved pedestrians; the second largest number involved automobile drivers. It is interesting to note that the number of automobile driver fatalities has decreased by 50% from 1987-88 (28) to 1988-89 and 1989-90 (14) while the number of pedestrian fatalities increased by 50%, from 24 in 1987-88 to 36 in 1988-89 and 33 in 1989-90.

Of the vehicular fatalities tested for alcohol (i.e. those in the hospital for less than 24 hours), drivers of automobiles and motorcycles as well as motorcycle passengers showed a positive test for ethyl alcohol more frequently than any other specific type of vehicular fatality. Excluding the heterogenous group of "Other/Unknown", pedestrians as a group had the highest average blood ethyl alcohol concentration (0.23%); auto passengers had the second highest level (0.21%). Automobile passengers and motorcycle drivers were those vehicular fatalities with the highest percentages of drugs present.

### Abuse Drug Involvement (Table XVI, page 35)

Cocaine was the abuse drug seen most frequently in vehicular fatalities (5 cases) followed in frequency by amphetamines (1 case). The number of vehicular fatalities with abuse drugs present was 6 during the current fiscal year as compared to 5 during the 1988-89 fiscal year and 15 in 1987-88.

### Age Distribution (Table XVII, p. 36, Table XVIII, p. 37, and Figure 15, p. 36)

The average age of motorcycle drivers was 28 years as compared to the average age of automobile drivers (38 years) and automobile passengers (40 years) who were vehicular fatalities during 1989-90. The mean age of pedestrians dying as traffic fatalities was the highest seen for any type of traffic fatality (57 years) with the 50 year and over age groups being overrepresented in the pedestrian fatalities (66%) as compared to the overall involvement of this age group in all types of traffic fatalities (44%). There was an 89% increase in vehicular deaths in the 20-29 year age group and a 167% increase in the 50-59 year age group as compared to 1988-89.

### Distribution by Sex (Table XVIII, page 37)

Males were the predominant victims in all types of traffic fatalities.

### Racial Distribution (Table XVIII and Figure 16, page 37)

Overall, vehicular fatalities occur more frequently in whites. Asians were represented more heavily among deaths of pedestrians (39%) and automobile passengers (33%) than would have been expected by their involvement in all vehicular fatalities (25%). Blacks were most heavily represented among auto drivers (36%), increasing from a 7% representation among auto drivers in 1988-89!

## VEHICULAR DEATHS

In San Francisco, there were 76 vehicle-related fatalities (65 accidents, 11 homicides and 1 death ruled to be equivocal), accounting for 5% of the Medical Examiner death investigations for the fiscal year 1989-90.

### TYPES OF VEHICULAR DEATHS FY 1989-90

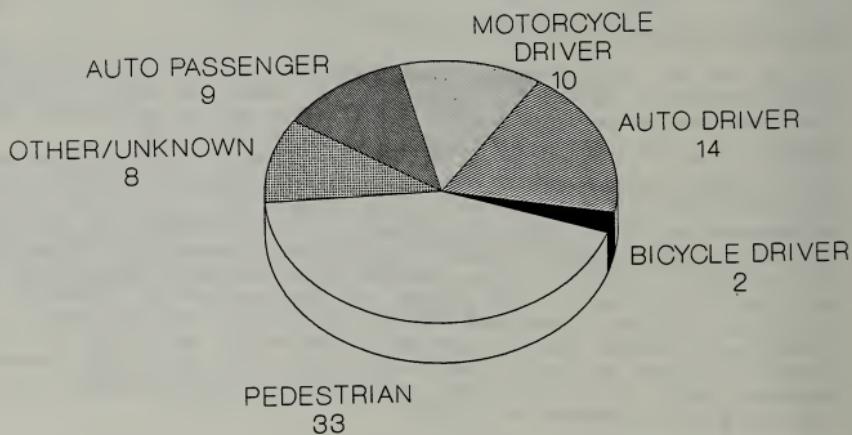


Figure 14.

TABLE XV. VEHICULAR FATALITIES IN 1989-1990

Drug and Alcohol Involvement

<u>METHOD</u>	<u>NO.</u>	<u>% WITH ALCOHOL*</u>	<u>AVE. ALC. CONC. (g%)</u>	<u>% WITH DRUGS*</u>	<u>% WITH DRUGS+ALC</u>
AUTO DRIVER	14 (18%)	58	0.19	8	8
AUTO PASSENGER	9 (12%)	17	0.21	33	17
BICYCLE DRIVER	2 ( 3%)	-	-	-	-
MOTORCYCLE DRIVER	10 (13%)	33	0.17	11	11
MOTORCYCLE PASSENGER	1 ( 1%)	100	0.10	0	0
PEDESTRIAN	33 (43%)	29	0.23	4	0
OTHER/UNKNOWN	7 ( 9%)	50	0.31	0	0

\* Refers to percentages of victims (of those tested) with positive blood ethyl alcohol levels.

\*\* Refers to percentage of victims (of those tested) with positive blood tests for abuse drugs.

TABLE XVI. ABUSE DRUGS PRESENT IN VEHICULAR FATALITIES

Drugs

<u>Situation</u>	<u>Cocaine</u>	<u>PCP</u>	<u>Heroin</u>	<u>Amphetamines</u>
AUTO DRIVER	1	0	0	0
AUTO PASSENGER	2	0	0	0
BICYCLE DRIVER	0	0	0	0
MOTORCYCLE DRIVER	1	0	0	1
MOTORCYCLE PASSENGER	0	0	0	0
PEDESTRIAN	1	0	0	0
UNKNOWN/OTHER	0	0	0	0
TOTALS	5	0	0	1

TABLE XVII. VEHICULAR FATALITIES BY AGE

<u>Situation</u>	<u>Age</u>										
	0-5	6-12	13-16	17-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
AUTO DRIVER	0	0	1 (7%)	2 (14%)	5 (36%)	2 (14%)	0	1 (7%)	0	2 (14%)	1 (7%)
AUTO PASSENGER	0	0	0 (11%)	1 (22%)	2 (22%)	1 (11%)	1 (11%)	1 (11%)	1 (11%)	1 (11%)	0
BICYCLE DRIVER	0	0	0 (50%)	1 (50%)	0 (50%)	1 (50%)	0	0	0	0	0
MOTORCYCLE DRIVER	0	0	0 (10%)	1 (60%)	6 (20%)	2 (10%)	1	0	0	0	0
MOTORCYCLE PASSENGER	0	0	0 (100%)	0 (100%)	1 (100%)	0 (100%)	0	0	0	0	0
PEDESTRIAN	0	1 (3%)	0 (6%)	0 (15%)	2 (9%)	5 (18%)	3 (18%)	6 (18%)	6 (9%)	3 (21%)	7
OTHER/UNKNOWN	0	0	0 (14%)	0 (14%)	1 (14%)	1 (14%)	1 (14%)	0	3 (43%)	1 (14%)	0
TOTALS	0	1	1	5	17	13	6	8	10	7	8
% of total	(0%)	(1%)	(1%)	(7%)	(22%)	(17%)	(8%)	(11%)	(13%)	(9%)	(11%)

\* Row percents refer to percentages by age group for each situation. These can be compared to total percentages for each age group to see if a situation is more or less prevalent in one age group. For example, accidental deaths of automobile drivers appear to occur more frequently in the 17-19 year age group (14%) than the general involvement of this age group in fatal vehicular accidents (7%), while accidental deaths of pedestrians in the 20-29 year age group (6%) occur less frequently than all vehicular accidents in this age group (22%).

## VEHICULAR DEATHS BY AGE

FY 1989-90

Figure 15.

AGE (yr)

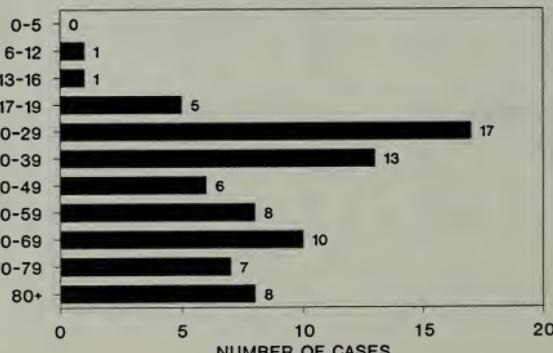


TABLE XVIII. DEMOGRAPHICS OF VEHICULAR FATALITIES

Situation	Sex		Race				Age	
	%M	%F	%W-NH	%W-H	%B-NH	%A	%O	AVE. AGE
AUTO DRIVER	79	21	29	29	36	7	0	38
AUTO PASSENGER	44	55	44	0	22	33	0	40
MOTORCYCLE DRIVER	100	0	70	0	30	0	0	28
PEDESTRIAN	64	36	39	12	8	39	0	57
BICYCLE DRIVER	100	0	100	0	0	0	0	28
OTHER/UNKNOWN	75	25	38	25	13	25	0	49
AVERAGE	71	29	43	13	17	25	0	46

The most notable change in demographics of vehicular fatalities from fiscal year 1988-89 was an increase in the involvement of blacks, from 7% in 1988-89 to 17% in 1989-90. Blacks were more heavily represented among auto and motorcycle drivers and auto passengers during 1989-90 than they were during 1988-89.

### RACE OF VEHICULAR DEATH VICTIMS FY 1989-90

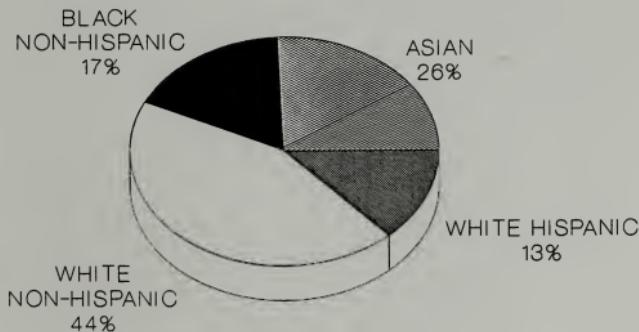


Figure 16.



## SUICIDES

The determination of suicide as a manner of death represents the summation of scene investigation, including a review of psychological state, autopsy, pathology, toxicology and, frequently, other investigation. To the best of our knowledge, ours is the only Medical Examiner's Office routinely performing toxicology testing on multiple organs and/or body fluids in order to evaluate the metabolic status of a drug or drugs.

Realizing the immense emotional impact on family, the diagnosis of suicide is never made lightly, and always represents a decision made on the basis of data sufficient to defend that decision in a court of law, if necessary. Should these data be inconclusive, the victim automatically gets the benefit of the doubt.

Suicide takes a tremendous toll of our young people. The relative number jumping from the Golden Gate bridge would not seem to warrant the publicity assigned them as compared to the evident need for help for individuals using other methods.

To help understand the problem, and hopefully, to aid in reduction of suicides, this office has supported suicide prevention and research programs for many years. It is hoped that this work will help to reduce this needless loss.

The majority of these deaths are situational reactions, and, if given momentary trained support, are potentially preventable.

## SUICIDAL DEATHS

One hundred and twenty-eight deaths were ruled to have been due to suicide during the 1989-90 fiscal year. The number of individuals dying by each method of suicide are presented in Figure 17, page 41, and Table XIX, page 42, and the percentages of all suicidal deaths by type are indicated in Table XIX, page 42. Of those individuals dying by suicide who were tested for alcohol and drugs (i.e. in the hospital less than 24 hours), less than 50%, on the average, had positive blood tests for alcohol and/or drugs.

### Abuse Drug Involvement (Table XX, page 42)

Heroin (measured as morphine) and cocaine were the abuse drugs seen most frequently in suicidal deaths (8 cases each). This represents a 47% decrease in the number of suicidal deaths in which heroin was found from 1988-89 (15 cases) to 1989-90. Although amphetamines were not found in any cases of suicidal deaths in 1988-89, they were found in 5 cases during 1989-90. Abuse drugs were associated more frequently with deaths caused by hanging (4 cases) than with any other mode of suicide except for drug overdose. Abuse drugs may have played a role in suicidal deaths by carbon monoxide poisoning (2 cases, firearms (2 cases), deaths due to jumping from the Golden Gate Bridge (2 cases) and 1 death due to traumatic injuries.

### Racial Distribution (Table XXI and Figure 18, page 43)

Deaths from suicide occurred most frequently in whites (87% of total suicides). This was also true for all modes of suicide separately. The white racial group has been divided into Hispanic and non-Hispanic in the tabulation. It can be seen that the white Hispanic group was involved in only 5% of all suicides but in 14% of all suicides by jumping from buildings while white non-Hispanics, who were involved in 82% of all suicides, were only involved in 57% of suicides by deaths by hanging. The mode of asphyxia/suffocation was used more frequently by Asians (17%) than would have been expected by the overall percentage of suicides by Asians (9%).

### Age Distribution (Table XXII, p. 44, Table XXIII, p. 45 and Figure 19, p. 45)

There were no deaths by suicide in the 0-16 year age group during this fiscal year. There was 1 suicide in the 17-19 year age group which represents a 50% decrease from the previous fiscal year. There was a 53% decrease in the number of suicides in the 60-89 year age group (from 51 to 24 such deaths) as compared to the previous fiscal year with a 71% decrease in the number of suicides in the 70-79 year age group (from 21 to 6!). The 30-39 year age group has the highest percentage of suicides of any age group with deaths from drug overdoses and hanging being particularly prevalent in this age group. Death by firearms appears to be the mode of suicide used most frequently by older adults with 43% of the deaths of those over age 60 being due to gunshot.

### Distribution by Sex (Table XXIV, page 46)

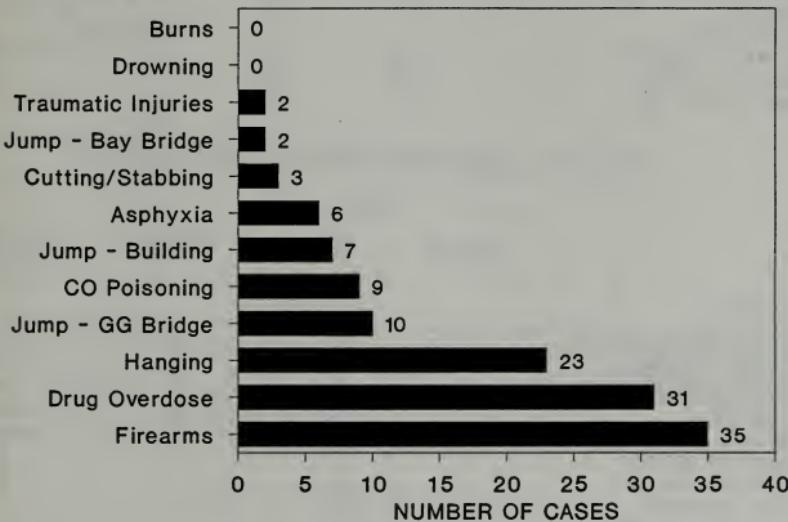
Males were more likely than females to commit suicide in 1988-89 (79% male, 21% female).

## SUICIDES

Suicides are self-inflicted deaths. In San Francisco, 128 suicides occurred, accounting for 8% of the Medical Examiner death investigations for the fiscal year of 1989-90.

### SUICIDE METHODS IN FY 1989-90

#### TYPES OF DEATHS



TOTAL = 128

Figure 17.

TABLE XIX. SUICIDAL DEATHS BY MODE

## Drug and Alcohol Involvement

<u>METHOD</u>	<u>NUMBER</u>	<u>% OF TOTAL SUICIDES</u>	<u>% WITH ALCOHOL</u>	<u>AVE. ALC. CONC.(g%)</u>	<u>% WITH DRUGS</u>
FIREARMS	35	27.3	26	0.23%	20
DRUG OVERDOSE	31	24.2	39	0.19%	-
HANGING	23	18.0	35	0.12%	24
JUMP-GG BRIDGE	10	7.8	40	0.13%	20
CO POISONING	9	7.0	11	0.10	33
JUMP-BUILDING	7	5.5	14	0.12%	14
ASPHYXIA/ SUFFOCATION	6	4.7	33	0.21%	17
CUTTING/STABBING	3	2.3	67	0.04%	0
JUMP-BAY BRIDGE	2	1.6	0	-	0
MULT. TRAUM. INJ.	2	1.6	0	-	100

TABLE XX. ABUSE DRUGS PRESENT IN SUICIDAL DEATHS

<u>Situation</u>	<u>Drugs</u>			
	<u>Cocaine</u>	<u>PCP</u>	<u>Morphine</u>	<u>Amphetamines</u>
ASPHYXIA/SUFFOCATION	0	0	0	0
AUTO/CO POISONING	1	1	0	0
CUTTING/STABBING	0	0	0	0
FIREARMS	0	0	2	0
HANGING	3	0	0	1
JUMP-BAY BRIDGE	0	0	0	0
JUMP-BUILDING	0	0	0	0
JUMP-GG BRIDGE	1	0	0	0
MULT. TRAUM. INJ.	0	0	0	1
DRUG OVERDOSE	3	1	6	2
TOTALS	8	2	8	5

TABLE XXI. SUICIDE METHODS BY RACE

Method	Race					Total
	W-NH	W-H	B-NH	Asian	Other	
Asphyxia/Strang.	5 (83%)	0	0	1 (17%)	0	6
CO Poisoning	8 (88%)	1 (12%)	0	0	0	9
Cutting/Stabbing	3 (100%)	0	0	0	0	3
Firearms	28 (80%)	3 (9%)	1 (3%)	2 (6%)	1 (3%)	35
Hanging	13 (57%)	1 (4%)	2 (9%)	6 (26%)	1 (4%)	23
Jump-Bay Brdg	2 (100%)	0	0	0	0	2
Jump-Building	5 (71%)	1 (14%)	1 (14%)	0	0	7
Jump-GG Brdg	10 (100%)	0	0	0	0	10
Mult. Traum. Inj.	1 (50%)	0	0	1 (50%)	0	2
Drug O.D.	30 (97%)	0	0	1 (3%)	0	31
TOTALS (NO.)	105	6	4	11	2	128
% OF TOTALS	82%	5%	3%	9%	2%	

\* Row percentages refer to percentages by race for each method. These can be compared to total percentages for each race to see whether a method is more or less prevalent in a racial group. For instance, suicides by hanging appear to occur more frequently in Asians (26%) than the general involvement of Asians in suicides (9%), while deaths by hanging in white/non-Hispanics (57%) occur less frequently than all suicides in white/non-Hispanics (82%).

### RACE OF SUICIDE VICTIMS FY 1989-90

Figure 18.

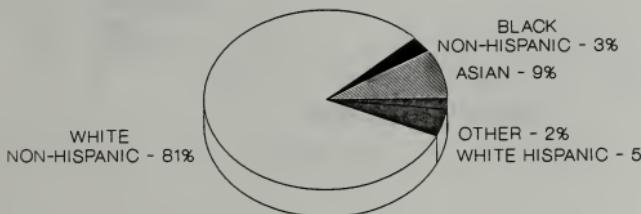


TABLE XXII. SUICIDE METHODS BY AGE

<u>Method</u>	<u>Age</u>									
	<u>13-16</u>	<u>17-19</u>	<u>20-29</u>	<u>30-39</u>	<u>40-49</u>	<u>50-59</u>	<u>60-69</u>	<u>70-79</u>	<u>80-89</u>	<u>90-99</u>
Asphyxia/Suffoc.	0	0	0	1 (17%)	2 (33%)	1 (17%)	0	0	2 (33%)	0
CO Poisoning	0	0	0	2 (22%)	3 (33%)	2 (22%)	1 (11%)	0	1 (11%)	0
Cutting/Stabbing	0	0	0	1 (33%)	0	1 (33%)	0	0	0 (33%)	1
Firearms	0	1 (3%)	2 (6%)	7 (20%)	10 (29%)	3 (9%)	5 (14%)	5 (14%)	1 (3%)	1 (3%)
Hanging	0	0	8 (35%)	8 (35%)	0	2 (9%)	2 (9%)	1 (4%)	1 (4%)	1 (4%)
Jump-Bay Bridge	0	0	1 (50%)	0	1 (50%)	0	0	0	0	0
Jump-Building	0	0	0	4 (57%)	2 (29%)	0	0	0	1 (14%)	0
Jump-GG Bridge	0	0	3 (30%)	3 (30%)	3 (30%)	0	1 (10%)	0	0	0
Mult. Traum. Inj.	0	0	0	2 (100%)	0	0	0	0	0	0
Drug Overdose	0	0	4 (13%)	11 (35%)	9 (29%)	3 (10%)	2 (6%)	0	1 (3%)	1 (3%)
TOTAL NO.	0	1	18	39	30	12	11	6	7	4
% OF TOTAL		0.8%	14%	30%	23%	9%	9%	5%	5%	3%

\* Row percents refer to percentage by age range for each method. These can be compared to total percentages for each age range to see if a method is more or less prevalent in an age group. For example, jumping from buildings appears to occur more frequently in the 30-39 years of age group (57%) than the general involvement of this age group in suicides (30%) while deaths from firearms in the 20-29 year age group (6%) occur less frequently than all suicides in this age group (14%).

## SUICIDES

TABLE XXIII. AGE RANGES - COMPARISON BY YEAR

<u>Age Range</u>	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88	'88-'89	'89-'90
0 - 19	9	4	7	7	2	6	3	1
20 - 29	37	34	27	29	22	36	30	18
30 - 39	48	44	37	46	45	28	33	39
40 - 49	20	21	25	18	28	24	28	30
50 - 59	20	26	20	18	30	23	22	12
60 - 69	17	20	21	19	20	19	19	11
70 - 79	18	18	15	12	12	17	21	6
80 - 89	9	12	4	10	9	5	11	7
90 - 99	2	3	2	2	3	4	3	4
Unknown	0	0	0	0	0	0	1	0

## SUICIDE VICTIMS BY AGE FY 1989-90

AGE (yr)

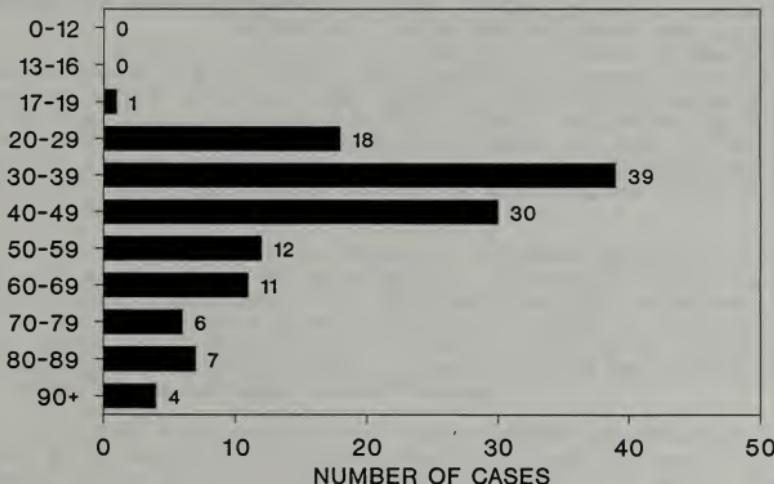


Figure 19.

TABLE XXIV. SUICIDE METHODS BY SEX

Method	Sex	
	Male	Female
Asphyxia/Strangulation	4 ( 67%)	2 ( 33%)
CO Poisoning	6 ( 67%)	3 ( 33%)
Cutting/Stabbing	2 ( 67%)	1 ( 33%)
Firearms	32 ( 91%)	3 ( 9%)
Hanging	21 ( 91%)	2 ( 9%)
Jump-Bay Bridge	0 ( 0%)	2 (100%)
Jump-Building	6 ( 86%)	1 ( 14%)
Jump-GG Bridge	6 ( 60%)	4 ( 40%)
Mult. Traum. Inj.	1 ( 50%)	1 ( 50%)
Drug Overdose	23 <u>( 74%)</u>	8 <u>( 26%)</u>
TOTALS	101 (79%)	27 (21%)

\* Row percents refer to percentages by sex for each mode. These can be compared to total percentages for each sex to see whether a mode is more or less prevalent in one sex. For example, deaths by firearms appear to occur more frequently in males (91%) than the general involvement of males in suicides (79%), while females die by hanging less frequently (9%) than all suicides in females (21%). During 1989-90, males constitute 79% of all suicide victims as compared to 70% in 1988-89. Also, the number of female suicide victims decreased 48%, from 52 in 1988-89 to 27 in 1989-90!

## HOMICIDE

Homicide is the killing of one human being by another. Murder is the unlawful killing of a human being with malice. The following data do not differentiate homicide as to whether it was justifiable, accidental, or murder. Such distinctions are the proper function of the judicial system and are not the responsibility or function of this office.

Any judicial system which deals with crimes involving death requires a well-trained staff and well-equipped Medical Examiner-Coroner's Office which can and will interpret forensic findings in an unbiased, fair manner. Their investigation must be intense, accurate and rapid enough so that charges may be pursued or dismissed without unfairly affecting an individual's constitutional rights. This is the purpose of this office.

The proper evaluation and investigation of a homicide begins, naturally, at the scene. In the majority of cases, a staff member of this office (either the Investigator, Administrative Coroner, or Medical Examiner), determines whether a death is potentially a homicide. It has been well-documented that, if such a determination is made by an individual inexperienced or untrained in death investigation, his opinion will be wrong in 50% of the cases. Such a person is very apt to miss the subtle homicide and is more inclined to miscall a natural or accidental death as homicide, resulting in false arrest, false accusations, needless expenditure of public funds, waste of investigative time and delay in the investigation of other deaths.

The Investigator responds to the scene of death and determines whether the Police Homicide Detail will be called. When homicide is obvious, the Investigator responds as part of a team (other members include homicide investigators, photographers and criminologists). This office is responsible for the body, identification, inquiry into circumstances, manner and means of death (Gov. Code 27491.2). In addition to the scene investigation, the Investigator is responsible for recovering property, locating and notifying next of kin, and preparing a written summary of his investigation.

In about one-third to one-half of all homicides, a forensic pathologist will respond to the scene and aid in the investigation. The subsequent autopsy may also use photography, fluoroscopy, X-ray, angiography and other techniques to establish and define the number, nature and severity of wounds, to obtain evidence (i.e. bullets) and to prepare an official report. This report, including chemistry, serology and toxicology results, is used as part of the prosecution or defense of the case in the formal judicial hearing.

Pertaining to criminal trial, our judicial system requires identification of an individual and presentation of evidence, usually by virtue of expert testimony, relative to the cause of death or trauma associated with death. The Medical Examiner-Coroner's Office identifies the body, frequently relying on local police, CII, or FBI fingerprints. Expert forensic testimony is given by

the Forensic Pathologist from this office. In addition, the Forensic Toxicologist is frequently called upon to testify on the significance and effect of various drug levels, a matter of great importance when dealing with the concept of diminished capacity.

Of minor, but increasing importance, is the fact we are seeing more homicide and trauma cases transferred into the County for medical therapy because of San Francisco's excellent and advanced medical facilities. Should these individuals die, the autopsy and court testimony are done by this office.

## HOMICIDE DEATHS

One hundred and four deaths were ruled to have been due to homicide during the 1989-90 fiscal year. The number of individuals dying by each manner of death by homicide are indicated in Figure 20, page 50 and Table XXV, page 51, and the percentage of all homicides represented by specific method used are indicated in Table XXV, page 51. While the total number of non-vehicular homicides increased only slightly, the number of homicide deaths by firearms increased 49%, from 41 to 61 cases! Of the homicide victims tested for alcohol and drugs (those in the hospital for less than 24 hours), a large percentage had positive blood alcohol levels as well as having drugs present. The percent of homicide victims with positive blood tests for drugs varied with the method of homicide with 34% of those dying by firearms and 31% of those dying from stabbing having drugs present.

### Abuse Drug Involvement (Table XXVI, page 51)

Cocaine was the abuse drug seen most frequently in homicide victims. It was found in 20 homicide cases or 21% (20/94) of all non-vehicular homicides. Cocaine was associated most strongly with deaths by gunshot wound, with 16 of the 20 cases with cocaine present (80%) being deaths due to gunshot wound. Heroin was the second most frequently found abuse drug and was associated with deaths due to gunshot wound with all 5 of the cases with heroin present being due to gunshot wound. Stabbing was the homicide method which was associated with drugs next most frequently to gunshot wound. Cocaine was present in 3 cases and PCP was present in 2 cases who died by stabbing.

### Racial Distribution (Table XXVII and Figure 21, page 52)

Overall, deaths by homicide occurred most frequently in whites (40%) followed closely in frequency by blacks (38%). Deaths by blunt trauma occurred with a greater frequency in whites (85%) than in blacks (14%). Deaths by firearms occurred with a greater frequency in blacks (45%) than in either whites (31%) or Asians (16%). Deaths by stabbing occurred much more frequently in white/Hispanics (35% of all stabbing deaths) than would have been predicted by the overall involvement of white/Hispanics in homicides of all types (13%). Vehicular deaths occurred more frequently in whites and less frequently in blacks than would be predicted based on the percentages of these racial groups involved in all types of homicides.

### Age Distribution (Figure 22, page 53, and Tables XVIII and XXIX, page 54)

There were 16 homicides in the 0-19 year age group. Half of these homicides were due to firearms. The peak occurrence of stabbing deaths was also in the 20-29 year age group. Of deaths due to firearms, 79% were in the 20-49 year age group as were 76% of the stabbing deaths. There were 10 homicides in individuals over the age of 60 during 1989-90 as compared to 6 in this age group during the previous fiscal year, an increase of more than 66%.

### Distribution by Sex (Table XXX, page 55)

Males were more than four times as likely to be homicide victims as females. This male predominance was even more pronounced for deaths by stabbing where all of the victims were male.

## NON-VEHICULAR HOMICIDES

Homicides are those deaths caused by another person, generally resulting in murder and manslaughter charges. In San Francisco, 94 non-vehicular homicides occurred in 1989-90, accounting for 6% of the total Medical Examiner investigations.

## HOMICIDE METHODS IN FY 1989-90

### TYPES OF DEATHS

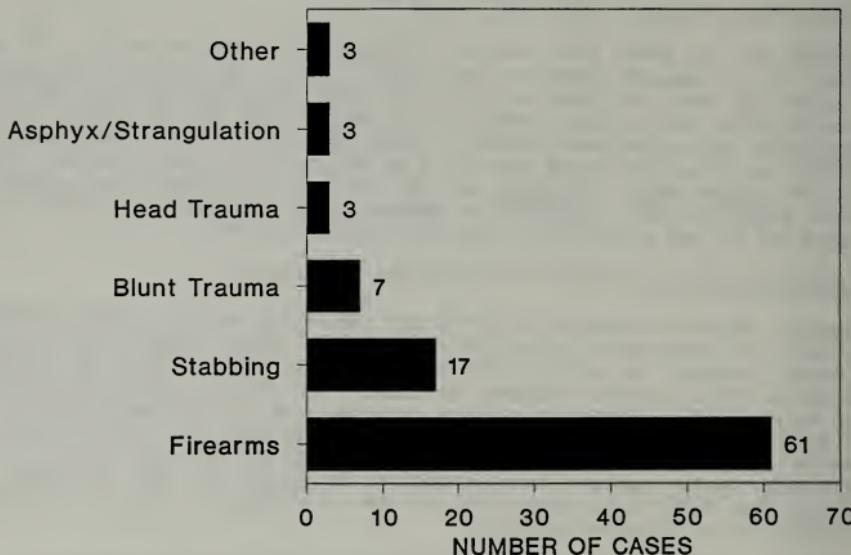


Figure 20.

TABLE XXV. HOMICIDAL DEATHS BY MODEDrug and Alcohol Involvement

<u>METHOD</u>	<u>NUMBER</u>	<u>% OF TOTAL HOMICIDES</u>	<u>% WITH ALCOHOL*</u>	<u>AVE. ALC. CONC.(g%)</u>	<u>% WITH DRUGS**</u>
FIREARMS	61	59	43	0.16%	34
STABBING	17	16	56	0.20%	31
VEHICULAR	10	10	13	0.15%	29
BLUNT TRAUMA	7	7	50	0.19%	17
ASPHYXIA/ STRANGULATION	3	3	0	-	0
HEAD TRAUMA	3	3	50	0.21%	0
OTHER	3	3	0	-	33

\* Refers to percentage of victims (of those tested) with positive blood ethyl alcohol concentrations

\*\* Refers to percentage of victims (of those tested) with positive blood tests for abuse drugs.

TABLE XXVI. DRUGS PRESENT IN NON-VEHICULAR HOMICIDAL DEATHSDrugs

<u>Situation</u>	<u>Cocaine</u>	<u>PCP</u>	<u>Heroin</u>	<u>Amphetamines</u>
ASPHYXIA/STRANGULATION	0	0	0	0
MULTIPLE TRAUM. INJURIES	1	0	0	0
GUNSHOT WOUND	16	1	5	2
STABBING	3	2	0	0
OTHER	0	0	0	1
TOTALS	20	3	5	3

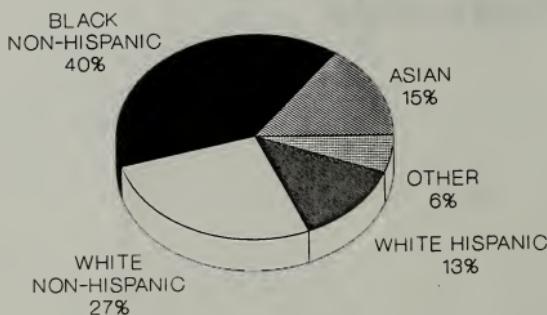
TABLE XVII. HOMICIDE METHODS BY RACE

Method	Race					Total
	W-NH	W-H	B-NH	Asian	Other	
Asphyxia/Strang.	1 (33%)	0	0	2 (67%)	0	3
Head Trauma	2 (67%)	0	0	1 (33%)	0	3
Vehicular	4 (40%)	1 (10%)	3 (30%)	2 (20%)	0	10
Firearms	14 (23%)	5 (8%)	27 (45%)	10 (16%)	5 (8%)	61
Stabbing	2 (12%)	6 (35%)	8 (47%)	1 (6%)	0	17
Blunt Trauma	5 (71%)	1 (14%)	1 (14%)	0	0	7
Other	0	1 (33%)	1 (33%)	0	1	3
TOTALS	28	14	40	16	6	104
% OF TOTAL	27%	13%	39%	15%	6%	

\* Row percentages refer to percentages by race for each method. These can be compared to total percentages for each race to see whether a method is more or less prevalent in a racial group. For instance, death by stabbing appears to occur more frequently in white/Hispanics (35%) than the general involvement of white/Hispanics in homicides (13%) while deaths due to stabbing appear to occur less frequently in Asians (6%) than all homicides in Asians (15%).

### RACE OF HOMICIDE VICTIMS FY 1989-90

Figure 21.



## HOMICIDE VICTIMS BY AGE FY 1989-90

AGE (yr)

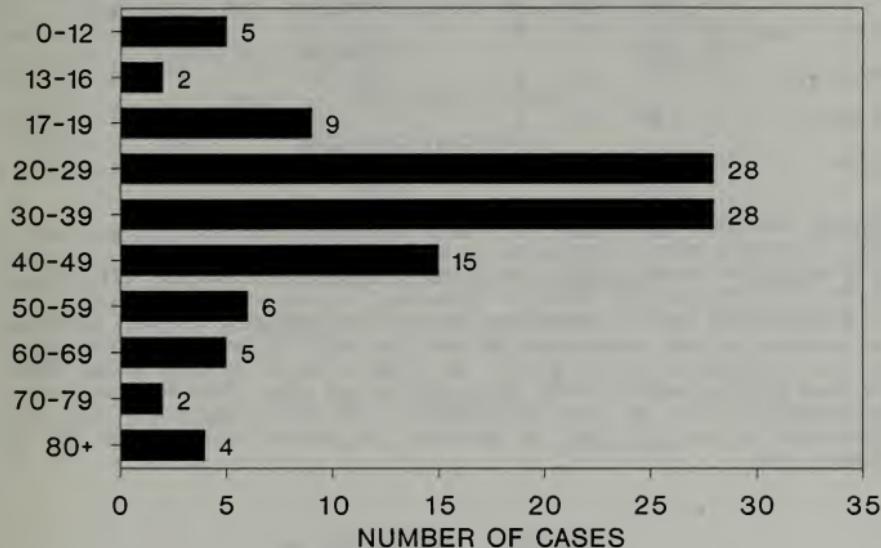


Figure 22.

TABLE XVIII. HOMICIDE METHODS BY AGE

Method	Age									
	0-12	13-16	17-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
Asphyxia/Strang.	0	0	1 (33%)	1 (33%)	0	0	0	0	0	1 (33%)
Head Trauma	0	0	0	0	0	0	2 (67%)	1 (33%)	0	0
Firearms	1 (2%)	2 (3%)	5 (8%)	21 (34%)	18 (30%)	9 (15%)	2 (3%)	1 (2%)	2 (3%)	0
Blunt Trauma	2 (29%)	0	0	0	1 (14%)	1 (29%)	1 (14%)	1 (14%)	0	0
Vehicular	0	0	2 (20%)	2 (20%)	3 (30%)		0 (10%)	1 (0%)	0	2 (20%)
Stabbing	0	0	1 (6%)	4 (24%)	5 (29%)	4 (24%)	0	2 (12%)	0	1 (6%)
Other	2 (67%)	0	0	0	1 (33%)	0	0	0	0	0
TOTALS	5	2	9	28	28	15	6	5	2	4
% OF TOTALS	(5%)	(2%)	(9%)	(27%)	(27%)	(14%)	(6%)	(5%)	(2%)	(4%)

\* Row percents refer to percentage by age range for each method. These can be compared to total percentages for each age range to see if a method is more or less prevalent in an age group. For example, deaths by blunt trauma appear to occur more frequently in the 40-49 years of age group (29%) than the general involvement of this age group in homicides (14%) while such deaths occur less frequently in the 20-29 years of age group (0%) than all homicides in this age group (27%).

TABLE XXIX. HOMICIDE VICTIMS  
AGE RANGES - COMPARISON BY YEAR

Age range	YEAR								
	'82-'83	'83-'84	'84-'85	'85-'86	'86-'87	'87-'88	'88-'89	'89-'90	
0 - 19	7	8	8	9	8	16	18	16	
20 - 29	26	21	30	40	28	28	31	28	
30 - 39	30	27	22	27	27	41	28	28	
40 - 49	16	16	10	18	18	12	15	15	
50 - 59	16	4	10	7	11	13	9	6	
60 - 69	6	6	5	4	8	8	4	5	
70 and above	2	3	10	15	10	5	2	6	

TABLE XXX. HOMICIDE METHODS BY SEX

<u>Method</u>	<u>Sex</u>	
	<u>Male</u>	<u>Female</u>
Asphyxia/Strangulation	1 ( 33%)	2 ( 67%)
Head Trauma	2 ( 67%)	1 ( 33%)
Firearms	52 ( 85%)	9 ( 15%)
Mult. Traum. Inj.	7 (100%)	0 ( 0%)
Vehicular	5 ( 50%)	5 ( 50%)
Stabbing	17 (100%)	0 ( 0%)
Other	1 ( 33%)	2 ( 67%)
TOTALS	85	19
% OF TOTALS	(82%)	(18%)

\* Row percents refer to percentages by sex for each mode. These can be compared to total percentages for each sex to see whether a mode is more or less prevalent in one sex. For example, deaths by stabbing occur more frequently in males (100%) than the general involvement of males in homicides (82%), while deaths by stabbing in females (0%) occur less frequently than all homicides in females (18%).



## PATHOLOGY

In the Pathology Department, tissue and body fluid samples taken at autopsy are prepared for microscopic study, histochemically stained, or analyzed for chemical constituents. Cardiac pacemakers or other mechanical life-support devices are examined for any defect. Smears or "wet-mounts" are examined for spermatozoa, bacteria, or tuberculosis. Bacteriologic cultures may be taken. However, if pathogens are grown, they are usually sent to the Department of Public Health (State or local) for further identification. If indicated, "soft" X-rays or histochemical tests are done to establish entrance or exit gunshot wounds. New research techniques, such as methods of obtaining fingerprints from the skin of a victim, are developed here also.

MONTHLY FIGURES

1989-1990

PATHOLOGY\*

YEAR	TOTAL MED-EXAM CASES	CASES REFERRED TO PATHOLOGIST	NO. OF ORGANS SUBMITTED	NO. OF SECTIONS TAKEN	HISTO PATHOLOGIC SLIDES MADE	SPECIAL STAINS **	BLOOD GROUPINGS ***	OTHER DETERMINATIONS ***
<b>1989</b>								
JUL	109	75	311	722	318	28	17	440
AUG	123	86	256	650	320	110	17	374
SEP	124	88	319	710	319	92	10	274
OCT	132	97	371	849	347	62	19	382
NOV	113	80	358	828	427	49	22	284
DEC	144	93	485	950	654	100	19	274
<b>1990</b>								
JAN	160	108	267	685	397	98	30	672
FEB	134	83	450	975	494	50	15	420
MAR	156	115	464	986	600	56	22	434
APR	134	95	489	1200	600	123	16	328
MAY	122	79	452	1054	576	33	28	364
JUN	124	85	451	1045	545	38	20	298
TOTALS	1575	1084	4673	10654	5597	839	235	4544

\* These figures do not reflect photography, forensic radiology, or material prepared for teaching forensic pathology  
 \*\* Includes smears examined for bacteria and spermatozoa  
 \*\*\* ABO and Anti-Rh  
 \*\*\*\* Blood, urine, water, evidence for: hematology, biochemistry, urinalysis, bacteriology, serology, "Sickledex," etc.

## TOXICOLOGY

Toxicology is the study of the interaction of foreign compounds, such as drugs, with living organisms (e.g. people). It involves knowing something of the nature of that interaction, how the foreign compounds break down (that is, how they are metabolized), and what effects they have on the health and behavior of the organism.

All of this information is vital to the role that toxicology plays in determining the cause of death, as well as in evaluating the significance of chemicals found in the living.

Generated within the Toxicology Department is information on samples from Medical Examiner's cases as well as from suspects in criminal cases (e.g.. homicides, driving under the influence, probation failure, (H & S 11550), assaults) and other persons to be tested at the request of various law enforcement agencies. The data obtained in these cases enable the toxicologist to assist in interpreting the behavior of the suspects involved, to advise the District Attorney, the Public Defender, the City Attorney, Police Department, the California Highway Patrol, and other agencies, and to give expert testimony in court as necessary in such cases as to the effect of drugs in the case. This application of toxicological facts to legal problems is Forensic Toxicology.

The Toxicology Department also performs analyses on samples submitted by the Police and Fire Departments in connection with the recruitment programs and other personnel requirements. The results in some cases are presented to the respective commission in official hearings.

Toxicological facts are determined through tests performed on biological samples (e.g. blood, urine, gastric contents, liver, etc.) taken at the time of autopsy or from living persons. The samples are subjected to a series of chemical manipulations designed to extract any drugs or other physiologically active compounds that may be present. The subsequent extracts are then examined by equipment set up to detect, accurately identify, and quantitate any materials that may be present. These determinations must be of unquestionable accuracy and as specific as scientifically possible, and they must be able to stand up to review by any other qualified laboratory in the nation.

The analytical methods most commonly used in the toxicological studies are gas and thin layer chromatography; ultraviolet, visible, and fluorescence spectrophotometry; and immunoassay techniques. Advanced techniques, such as mass spectrometry and HPLC (High Performance Liquid Chromatography) are used as necessary for confirmation of difficult samples. These precise and sophisticated methods require the use of advanced laboratory apparatus and highly trained personnel.

## Toxicology, Continued

Levels of drugs in two or more body compartments (one of which is invariably blood) are routinely determined in order to answer the question of whether the drug use is acute or chronic. This approach is of the utmost importance in determining the time of ingestion and whether or not the intent of the ingestion was suicide.

The range of drugs available to the public is extremely wide, and the nature and type of compounds involved are highly variable. The methodologies necessary to conduct toxicological analyses have to be similarly wide-ranging and also continually expanded in order to keep up with the manufacture of new drugs, both legal and illegal. This is an important aspect of the Toxicology Department's work, often requiring extensive research. So, too, does the identification of "street-manufactured" compounds which are sometimes found in post-mortem samples. Also, with many drugs being compounded to have physiologic effects at very low doses, detection in body fluids is often extremely difficult.

The most common drugs in the community are alcohol and prescription items. However, illegal, or "street", drugs (especially morphine-type alkaloids [e.g. heroin], cocaine, and amphetamines) represent a very significant percentage of the compounds actually found in the cases presented to the Toxicology Department. Less commonly used drugs, industrial materials, certain gases, and various other foreign compounds have also been detected.

TOXICOLOGY  
MEDICAL EXAMINER - CORONER'S CASES

SAN FRANCISCO CITY AND COUNTY  
July 1989 - June 1990

Incidence of drugs and other physiologically active material detected

The compounds listed are not necessarily the cause of death nor even a contributing factor. They are the toxic agents that were found to be present, either singly or in combination, in Medical Examiner's cases.

ABUSE DRUGS

Morphine-type alkaloids	149
Cocaine	123
Benzoylecgonine	122*
Codeine	77
Methamphetamine	46
Amphetamine	41
Phencyclidine (PCP)	7

ANTI-DEPRESSANTS

Amitriptyline (Elavil)	20
Nortriptyline (Aventyl)	15
Doxepin (Sinequan)	5
Desipramine (Norpramin)	5
Imipramine (Tofranil)	4

ANALGESICS - NARCOTIC

Methadone	13
Methadone Metabolite	6
Hydrocodone	4
Hydromorphone	4
Meperidine	4
Meperidine metabolite	3
Propoxyphene (Darvon)	3
Norpropoxyphene	3
Oxycodone	1

SEDATIVE-HYPNOTICS

Barbiturates	
Phenobarbital	5
Pentobarbital	4
Secobarbital	3
Amobarbital	1

ANALGESICS - NON-NARCOTIC

Salicylates	14
Acetaminophen	9

SEDATIVE-HYPNOTICS

Non-Barbiturates

Chloral Hydrate metabolite	1
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CARDIAC DRUGS

Lidocaine	76
Metoprolol (Lopressor)	1

ANTI-ANXIETY AGENTS

Diazepam (Valium)	27
Nordiazepam	26
Chlordiazepoxide (Librium)	10
Alprazolam (Xanax)	5
Triazolam (Halcion)	4
Flurazepam (Dalmane)	4
N-Desalkylflurazepam	4
Lorazepam (Ativan)	1

ANTIHISTAMINES

Diphenhydramine	9
-----------------	---

Drugs Detected, Continued

ANTITUSSIVES

Dextromethorphan

3

ANTICONVULSANTS

Diphenylhydantoin (Dilantin) 12

Carbamazepine (Tegretol) 1

Clonazepam (Klonopin) 1

ANTIMALARIALS

Pyrimethamine

1

ANTIPSYCHOTIC AGENTS

Chlorpromazine

4

Thioridazine

3

Prochlorperazine

1

Trifluoperazine

1

DECONGESTANTS

Phenylpropanolamine

4

VITAMINS

Ascorbic Acid

1

MISCELLANEOUS

Carbon Monoxide

17

Acetone

4

Cyanide

3

Ethylene Glycol

1

Methyl Alcohol

1

Iso-Propyl Alcohol

1

Gasoline

1

Methane

1

Nitrous Oxide

1

BRONCHODILATORS

Ephedrine

16

Theophylline

2

MUSCLE RELAXANTS

Carisoprodol

1

ANALEPTICS

Caffeine

9

CARDIAC GLYCOSIDES

Digoxin

1

ANTI-INFECTIVES

Trimethoprim

1

ANESTHETICS

Ketamine

1

PSYCHOTOGENICS

Lysergic Acid

Diethylamide (LSD) 1

TOXICOLOGY

MEDICAL EXAMINER - CORONER'S CASES

SAN FRANCISCO COUNTY  
July 1989 - June 1990

<u>Year/ Month</u>	<u>No. of Cases Referred to Toxicology</u>	<u>No. of Specimens Received</u>	<u>No. of Tests Performed</u>	<u>No. of Tests Per Case</u>	<u>Alcohol Tested</u>	<u>Pos.</u>	<u>% Pos.</u>
<u>1989</u>							
JUL	107	817	806	7.5	98	15	15.3
AUG	127	950	895	7.1	108	27	25.0
SEP	120	875	870	7.3	114	19	16.7
OCT	130	1,008	916	7.1	125	27	21.6
NOV	116	908	895	7.7	106	23	21.7
DEC	130	1,007	943	7.3	122	25	20.5
<u>1990</u>							
JAN	173	1,357	1,447	8.4	163	33	20.2
FEB	134	1,059	1,037	7.7	125	29	23.2
MAR	149	1,134	1,083	7.3	137	31	22.6
APR	142	1,122	962	6.8	129	25	19.4
MAY	123	992	929	7.6	102	24	23.5
JUN	116	903	937	8.1	110	27	24.6
<b>TOTAL</b>	<b>1,567</b>	<b>12,132</b>	<b>11,720</b>	<b>7.5</b>	<b>1,439</b>	<b>305</b>	<b>21.2</b>

TOXICOLOGYFORENSIC TOXICOLOGY CASES  
JULY 1989 - JUNE 1990

Cases in which specimens were referred to the Medical Examiner's Toxicology Laboratory for forensic toxicological examination generally were criminal cases in which the presence of drugs was suspected either in the victim or suspect of the crime. Testing of 11550, probation, DUI, management control, out-of-county and other miscellaneous cases is included in this tabulation.

YEAR/MONTH	No. Cases Referred to Toxicology	No. of Specimens Received	No. Of Tests Performed
<u>1989</u>			
JUL	516	607	2,915
AUG	590	686	3,281
SEP	539	681	3,052
OCT	656	791	3,668
NOV	707	840	3,920
DEC	604	749	3,281
<u>1990</u>			
JAN	473	599	2,711
FEB	369	500	2,109
MAR	480	626	2,749
APR	473	606	2,661
MAY	457	673	2,602
JUN	434	624	2,400
<hr/> TOTAL	6,298	7,982	35,331

## TOXICOLOGY

### FORENSIC TOXICOLOGY CASES JULY 1989 - JUNE 1990

Incidence of drugs detected in all cases submitted to the Medical Examiner - Coroner's Office Toxicology Laboratory for forensic toxicological examination.

The samples in which these compounds were found to be present, either singly or in combination, were generally obtained from either suspects or victims in criminal cases, probationers or via management control investigations.

#### TYPE OF CASE

<u>Drug</u>	<u>11550</u>	<u>DUI</u>	<u>Probation</u>	<u>Other*</u>
Ethyl alcohol	10	343	-	24
Cocaine	232	63	464	14
Benzoylegonine	235	63	740	15
Phencyclidine (PCP)	127	37	5	2
Morphine-type alkaloids	236	9	25	2
Methamphetamine	59	27	42	5
Amphetamine	58	19	35	2
Codeine	16	9	23	1
Methadone	6	5	-	1
Methadone metabolite	5	3	-	1
Ephedrine	6	-	-	22
Phenylpropanolamine	2	-	-	10
Methaqualone	1	12	-	-
Alprazolam	1	1	-	-
Flurazepam	1	-	-	-
N-Desalkylflurazepam	1	-	-	-
Delta-9-Tetrahydro- cannabinol	1	6	37	-
11-Nor-Delta-9-THC- Carboxylic Acid	-	4	20	-
Lidocaine	-	2	-	1
Temazepam	-	1	-	-
Clonazepam	-	1	-	-
Ethchlorvynol	-	1	-	-
Caffeine	-	3	-	1
Naloxone	-	1	-	-
Meperidine metabolite	-	1	-	-
MDMA	-	1	-	-
Quinidine	-	-	-	1
Lorazepam	-	-	-	4
Triazolam	-	-	-	1
Diazepam	-	-	-	1
Nordiazepam	-	-	-	1
Hydrocodone	-	-	-	1

\* "Other" includes testing of homicide suspects, Police and Fire Department recruits, management controls, out-of-county cases, and other miscellaneous cases.



## ABUSE DRUGS

The role of abuse drugs in deaths during the 1989-90 fiscal year is presented in this section. The four abuse drugs most commonly seen in Medical Examiner's cases - cocaine, heroin, amphetamines and PCP - will be examined. The number of cases in which these drugs were found either alone or in combination with other abuse drugs are presented in Table XXXI, page 69. Cocaine was the most frequently observed drug of abuse where drugs were present alone while heroin was the most frequently observed drug when drugs were present in combination.

### Distribution by Sex (Table XXXII, page 70 and Figures 23 and 24, page 71)

In deaths caused by abuse drugs (DC) or deaths related to abuse drugs (DR), where the drugs were present either singly or in combination, 75-100% of the deceased individuals were males.

### Distribution by Race (Table XXXII, page 74)

White/Non-Hispanic (W-NH) - In drug-caused deaths where abuse drugs were present either singly or in combination with other abuse drugs, the white non-Hispanic racial group predominated in deaths caused by amphetamines and heroin.

Black/Non-Hispanic (B-NH) - In drug-caused and drug-related deaths where abuse drugs were present singly, the black non-Hispanic racial group predominated in deaths where cocaine was present. This racial group was only minimally represented in drug-caused deaths where heroin alone was present (11%).

White/Hispanic (W-H) - This racial group was most heavily represented in deaths where PCP was present, either alone or in combination with other drugs. However, the Involvement of this group increased in all types of deaths caused or related to all of the abuse drugs being considered here, as compared to the previous fiscal year.

### Distribution by Age (Table XXXII, page 70 and Figures 25 and 26, page 72)

In deaths where abuse drugs were present singly, there were some notable differences in mean ages of the victims. Users of PCP (drug-related deaths only) were of a considerably younger mean age (27.0 years) as compared to the mean ages of users of cocaine (drug-caused, 37.4 years) and heroin (37.9 years). The mean age of amphetamine users whose deaths were caused by drugs increased considerably from the 1988-89 mean of 30.8 years to 40.7 years in 1989-90. In deaths where abuse drugs were present in combination, the mean ages of users of cocaine, heroin and amphetamines were more homogeneous than in deaths where drugs were present singly, but the mean age of victims with PCP present was still considerably lower (24.0 years).

### Alcohol Involvement (Table XXXII, page 70)

The presence of alcohol in the blood of abuse drugs users was most often associated with deaths related to heroin alone (100%) and was least associated with deaths due to amphetamines alone (22%).

#### Deaths Involving Cocaine (Tables XXXIII and XXXIV, p. 73 and Figure 27, p. 74)

Cocaine alone was the cause of death in 25 cases by overdose, a slight increase from the previous fiscal year (22 cases). Cocaine alone was also present in 28 non-drug caused deaths (See Table XXXIII) including 7 ruled to be accidental, 3 ruled to be by suicide and 16 ruled to be by homicide. Notably, 15 of these 28 deaths (54%) were due to gunshot or stabbing.

Cocaine in combination with other drugs was the cause of death in 47 cases by overdose. Cocaine in combination was also present in 9 non-drug caused deaths (See Table XXXIV) including 4 cases ruled to be homicides. Of these 9 deaths, 4 (44%) were by gunshot.

The number of deaths due to cocaine over the last 7 fiscal years is shown in Figure 27. It can be seen that the number of deaths due to cocaine has been rising steadily since 1985.

#### Deaths Involving Heroin (Figure 28, page 74 and Table XXXV, page 75)

Heroin alone was the cause of death in 46 cases by overdose, an increase of only 4 cases over the preceding fiscal year. Heroin alone also was present in 2 non-drug caused deaths. The involvement of heroin alone in non-drug caused deaths was very minimal as compared to the involvement of cocaine in this type of death, both in number and means of death.

Heroin in combination with other drugs was the cause of death in 65 cases by overdose, an increase of only 6 cases over the previous fiscal year. Heroin in combination was present in 8 non-drug caused deaths, 5 of which (63%) were due to gunshot.

The numbers of deaths due to heroin over the last 19 fiscal years are shown in Figure 28, page 74. The number of such deaths for 1989-90 is the highest seen over this time period.

#### Deaths Involving Amphetamines (Table XXXVI, page 76)

Amphetamines alone were the cause of death in 9 cases by overdose, an increase of 80% over the previous fiscal year. Amphetamines alone were also present in 4 non-drug caused deaths, 2 of which were homicides by gunshot.

Amphetamines in combination with other drugs were the cause of death in 25 cases by overdose, an increase of 92% over the previous fiscal year! Amphetamines in combination with other drugs were present in 3 non-drug caused deaths.

TABLE XXXI. ABUSE DRUGS  
SAN FRANCISCO MEDICAL EXAMINER-CORONER'S CASES

Abuse Drugs Present Alone

<u>Drug</u>	<u>Drug Caused Deaths</u>	<u>Drug Related Deaths</u>	<u>Role Unclear</u>	<u>Incidental Finding</u>
Cocaine alone	25	28	10	3
Heroin alone	46	2	2	9
Amphetamines alone	9	4	0	2
PCP alone	0	3	0	0

Abuse Drugs Present in Combination with Other Drugs

<u>Drug</u>	<u>Drug Caused Deaths</u>	<u>Drug Related Deaths</u>	<u>Role Unclear</u>	<u>Incidental Finding</u>
Cocaine in combination	47	9	1	2
Heroin in combination	65	8	2	2
Amphetamines in combin.	25	3	0	0
PCP in combination	2	2	0	0

TABLE XXXII. ABUSE DRUGS

## INCIDENCE BY SEX, RACE, AGE, AND ALCOHOL INVOLVEMENT

Drugs Present Singly

Drug	SEX		RACE			Mean Age	% WITH ALCOHOL	AVE. ALC. CONC (g%)
	%M	%F	%W-NH	%W-H	%B-NH			
COCAINE-DC*	84	16	36	16	48	37.4	48	0.15
COCAINE-DR**	89	11	29	14	36	29.8	43	0.15
HEROIN-DC*	93	7	78	11	11	37.9	64	0.19
HEROIN-DR**	100	0	0	50	50	36.0	100	0.15
AMPHET.-DC*	89	11	89	0	11	40.7	22	0.24
AMPHET.-DR**	100	0	100	0	0	36.3	33	0.26
PCP-DC*	-----NONE-----							
PCP-DR**	100	0	0	67	0	27.0	67	0.07

Drugs Present in Combination

Drug	SEX		RACE			Mean Age	% WITH ALCOHOL	AVE. ALC. CONC (g%)
	%M	%F	%W-NH	%W-H	%B-NH			
COCAINE--DC*	78	22	44	17	51	40.7	54	0.19
COCAINE--DR**	78	22	22	22	44	32.0	56	0.16
HEROIN--DC*	83	17	47	14	38	36.7	44	0.16
HEROIN--DR**	75	25	38	13	50	34.5	25	0.12
AMPHET--DC*	84	16	72	4	8	35.8	28	0.20
AMPHET--DR**	100	0	67	33	0	31.0	33	0.18
PCP+-DC*	100	0	0	100	0	24.0	0	-
PCP+-DR**	100	0	0	50	0	29.0	50	0.16

\* DC = Drug Caused

\*\* DR = Drug Related

# ABUSE DRUG DEATHS 89-90

## DRUG PRESENT ALONE

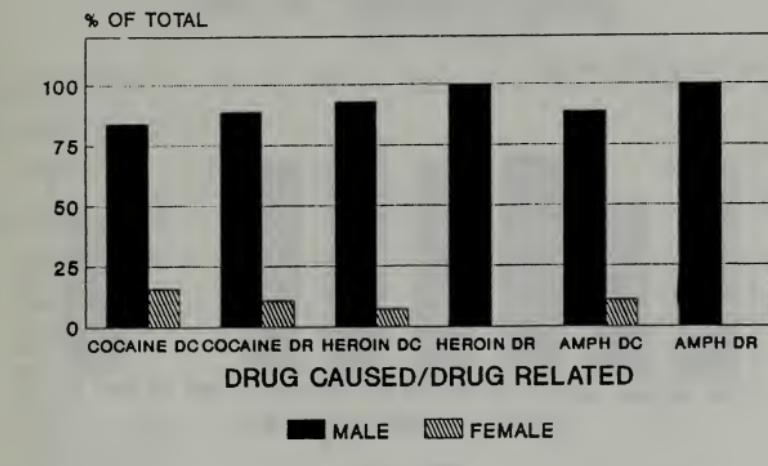


Figure 23.

# ABUSE DRUG DEATHS 89-90

## DRUGS PRESENT IN COMBINATION

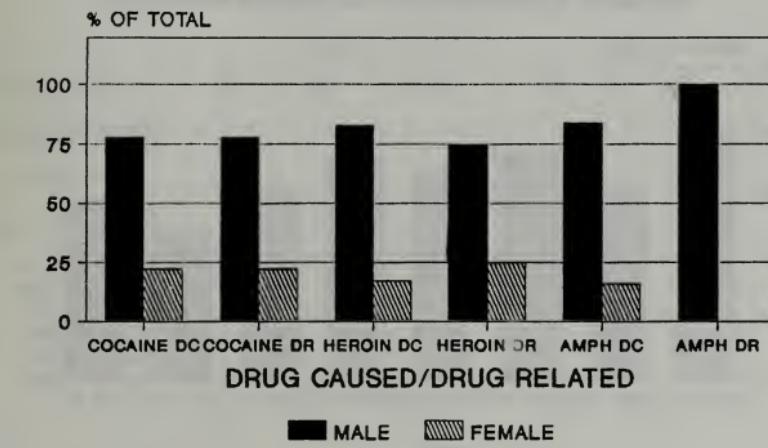
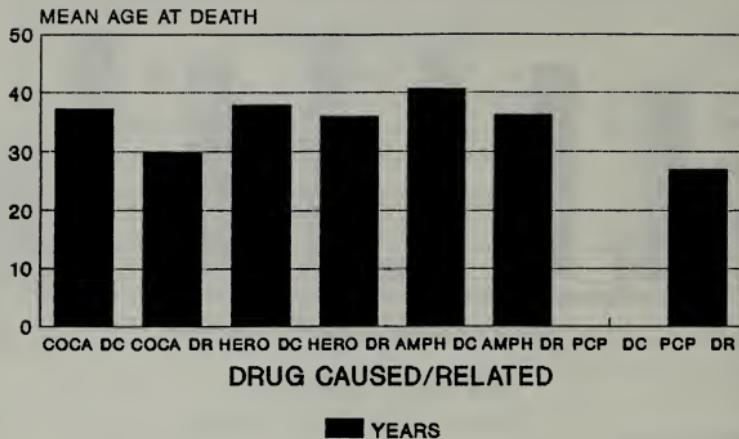


Figure 24.

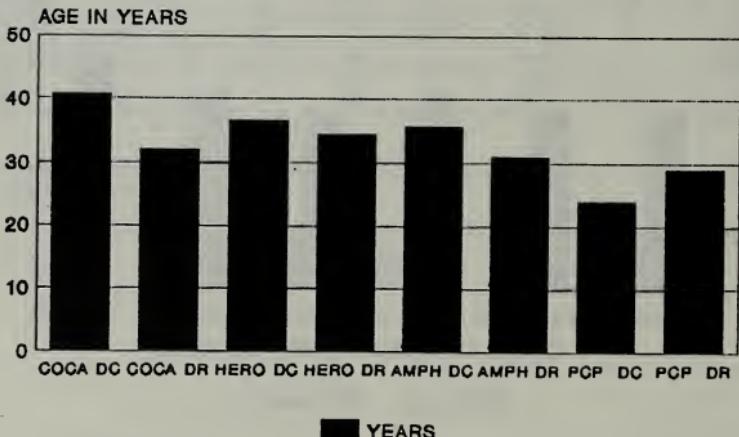
# ABUSE DRUG DEATHS DRUG PRESENT ALONE



MEAN AGE IN YEARS

Figure 25.

# ABUSE DRUG DEATHS DRUG PRESENT-COMBINATION



MEAN AGE IN YEARS

Figure 26.

DEATHS INVOLVING COCAINE

TABLE XXXIII. COCAINE PRESENT ALONE

Manner of Death

<u>CAUSE OF DEATH</u>	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UNK</u>	<u>TOTALS</u>
<u>Drug Caused Deaths</u>						
OVERDOSE	24	0	0	1	0	25
<u>Drug Related Deaths</u>						
ELECTROCUTION	0	0	0	1	0	1
HANGING	0	3	0	0	0	3
GUNSHOT WOUND	0	0	12	0	0	12
TRAUMATIC INJ.	0	0	1	0	0	1
STABBING	0	0	3	0	0	3
DROWNING	1	0	0	0	0	1
FALLS	2	0	0	0	0	2
EXSANGUINATION	1	0	0	0	0	1
VEH-AUTO DRIVER	1	0	0	0	0	1
INTRACEREBRAL HEMORRHAGE	1	0	0	1	0	2
ENDOCARDITIS	1	0	0	0	0	1
TOTALS	31	3	16	3	0	53

TABLE XXXIV. COCAINE IN COMBINATION WITH OTHER DRUGS

<u>CAUSE OF DEATH</u>	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UNK</u>	<u>TOTALS</u>
<u>Drug Caused Deaths</u>						
OVERDOSE	41	2	0	4	0	47
<u>Drug Related Deaths</u>						
CO POISONING	0	1	0	0	0	1
STRANGULATION	0	0	0	1	0	1
VEHICULAR	1	0	0	0	0	1
JUMP-GG BRIDGE	0	1	0	0	0	1
GUNSHOT WOUND	0	0	4	0	0	4
SMOKE INHALATION	1	0	0	0	0	1
TOTALS	43	4	4	5	0	56

## COCAINE DEATHS DRUG PRESENT-ALONE OR IN COMBINATI

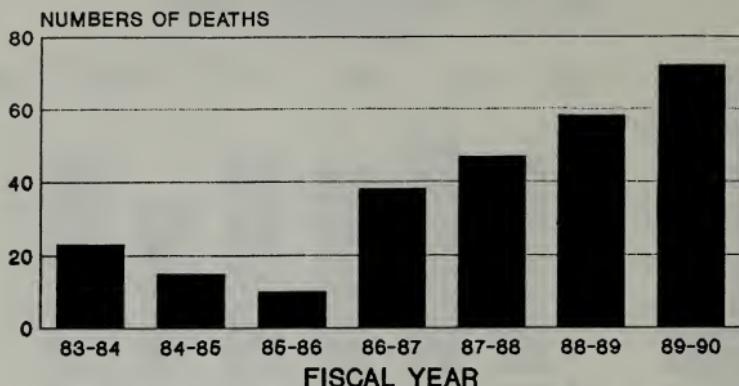


Figure 27

## HEROIN DEATHS

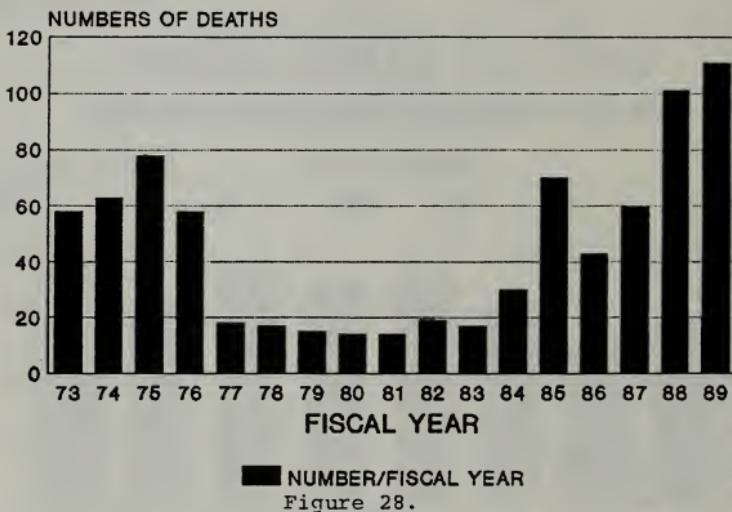


Figure 28.

TABLE XXXV. DEATHS INVOLVING HEROINHEROIN PRESENT ALONE

CAUSE OF DEATH	Manner of Death					TOTALS
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UND</u>	
<u>Drug Caused Deaths</u>						
OVERDOSE	44	1	0	0	1	46
<u>Drug Related Deaths</u>						
GUNSHOT WOUND	0	0	1	0	0	1
SEPSIS	1	0	0	0	0	1
TOTALS	45	1	1	0	1	48

HEROIN PRESENT IN COMBINATION WITH OTHER DRUGS

CAUSE OF DEATH	Manner of Death					TOTALS
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQUIV</u>	<u>UND</u>	
<u>Drug Caused Deaths</u>						
OVERDOSE	58	5	0	1	1	65
<u>Drug Related Deaths</u>						
GUNSHOT WOUND	0	1	4	0	0	5
STRANGULATION	0	0	0	1	0	1
FALL	2	0	0	0	0	2
TOTALS	60	6	4	2	1	73

TABLE XXXVI. DEATHS INVOLVING AMPHETAMINES

AMPHETAMINES PRESENT ALONE

CAUSE OF DEATH	<u>Manner of Death</u>					<u>TOTAL</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UNK</u>	
<u>Drug Caused Deaths</u>						
OVERDOSE	9	0	0	0	0	9
<u>Drug Related Deaths</u>						
HANGING	0	1	0	0	0	1
TRAUMATIC INJURIES	0	1	0	0	0	1
GUNSHOT WOUND	0	0	2	0	0	2
TOTALS	9	2	2	0	0	13

AMPHETAMINES PRESENT IN COMBINATION WITH OTHER DRUGS

CAUSE OF DEATH	<u>Manner of Death</u>					<u>TOTAL</u>
	<u>ACC</u>	<u>SUI</u>	<u>HOM</u>	<u>EQ</u>	<u>UNK</u>	
<u>Drug Caused Deaths</u>						
OVERDOSE	22	1	0	1	1	25
<u>Drug Related Deaths</u>						
VEHICULAR	1	0	0	0	0	1
JUMP-GG BRIDGE	0	1	0	0	0	1
SMOKE INHALATION	0	0	1	0	0	1
TOTALS	23	2	1	1	1	28

## GLOSSARY

ALKALOID OF MORPHINE GROUP	Typically referred to as morphine-type alkaloid, this is the chemical substance found in body fluids after the injection of heroin or other drugs derived from opium
TOXICOLOGY NOT VALID OR ELIMINATED	This term indicates that the deceased lived long enough after the injury to have eliminated some or all toxic agents from the body
FORENSIC PATHOLOGY	The specialty field of medicine involving the application of medical and pathology principles in determining the cause and manner of sudden, unexpected, and medically unattended deaths. This includes the type and nature of injury, public health hazards, type or nature of homicide weapon, the relation of injury to death and interpreting other factors for the court. These data are prepared and presented to the judicial system or public health interests in keeping with the best available knowledge
MODE OF DEATH	Indicates the manner of death, such as natural, accident, suicide or homicide, and is to be distinguished from cause of death, which is purely a medical determination
MODE EQUIVOCAL	With the cause of death determined, investigative data do not clearly differentiate between two modes of death, although some evidence supports one more likely
MODE UNDETERMINED	With the cause of death determined, investigative data do not clearly support one of two possible modes and either one is possible without prejudice
MODE UNKNOWN	Circumstances insufficient to indicate between possible modes, as when only bones are found, or when no medical cause of death is determined
PATHOLOGY	That branch of medicine which deals with the essential nature of disease, especially in the structural or functional changes in tissues, organs or systems of the body causing disease. It involves the diagnosis of disease by microscopic or chemical analysis
SEROLOGY	That branch of pathology which deals with the analysis of blood and body fluids. Blood types for identification, exclusion of a suspect or judicial purposes are examples of the use in this office

TOXICOLOGY

The scientific study of poisons, their detection, actions and treatment. The relationship of drug levels to emotional or personality change, behavioral or reasoning ability are frequent decisions based on these data

MEDICAL EXAMINER

A physician specifically trained in forensic pathology who is responsible for investigating and determining the cause and manner of sudden or unexpected death

AUTOPSY

A scientific dissection of the human body to determine the cause and nature of death in order to detect public health hazards, determine the method or type of death in homicides and improve the level of medical care in the community. In some cases, showing that no injury or wrongdoing was present is of great emotional and stabilizing value to the family











